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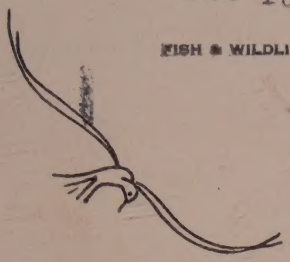
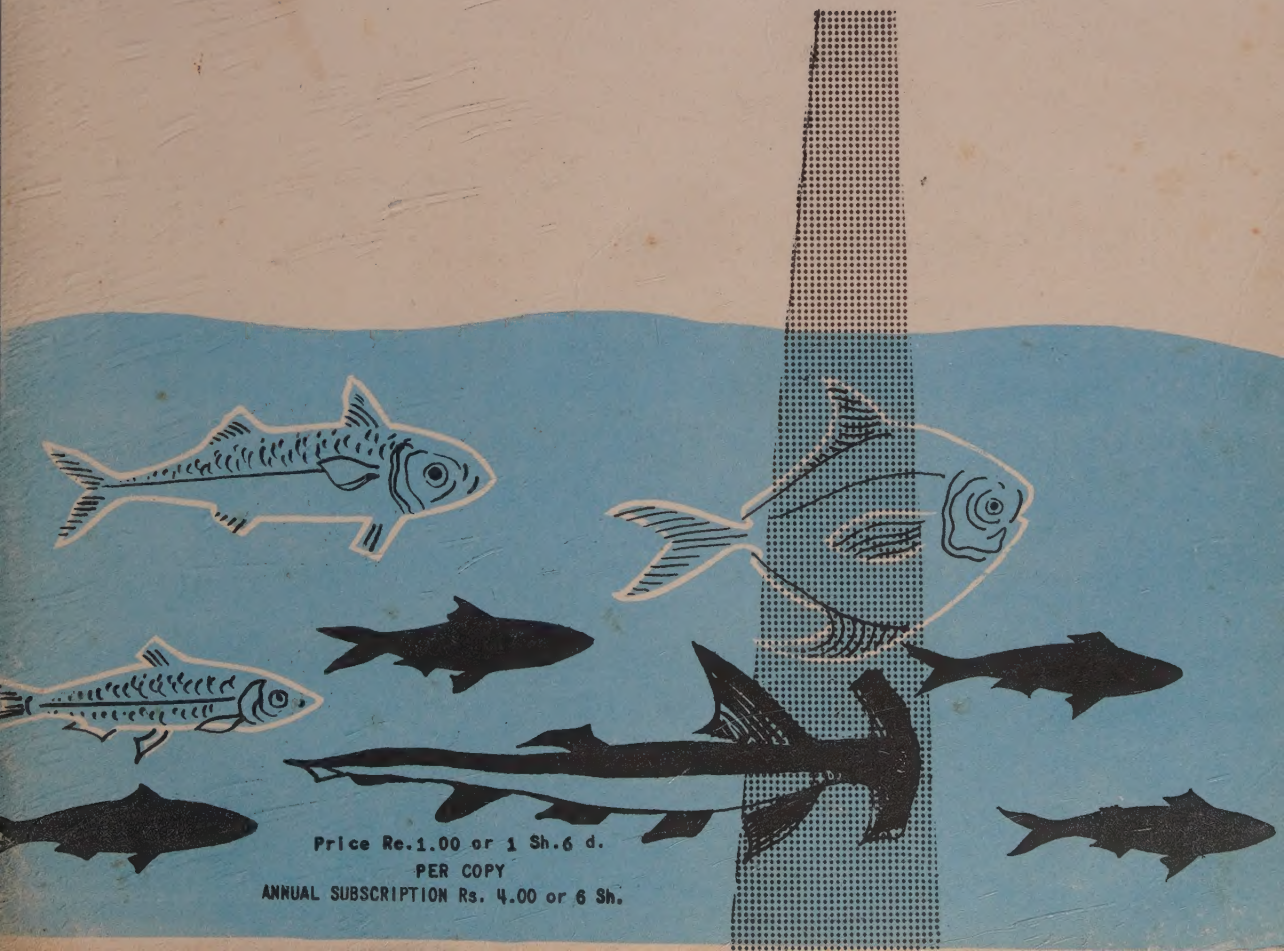


INDIAN FISHERIES BULLETIN



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INDIAN FISHERIES BULLETIN

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REVIEW OF THE DEVELOPMENT OF FISHERIES IN INDIA UNDER THE SECOND FIVE YEAR PLAN (1956-57 to 1960-61)

The Second Five Year Plan of Fisheries Development which had the main objectives of increasing fish production and developing the fishing industry, made substantial progress in both these directions in the inland as well as marine sectors. Out of a total outlay of Rs. 10.73 crores provided for the State and Central Schemes, Rs. 9.06 crores were spent. The annual total fish production in the country rose from the maximum of 10 lakh metric tons during the First Plan period to 14 lakh tons by the end of the Second Five Year Plan.

Inland Fisheries

The programme of culturing fish in ponds and other impounded waters, made striking progress and about 5 lakh additional acres of water area were brought under fish culture. A total of 180 crores of fry and fingerlings were raised in nurseries and distributed for stocking in different areas, 60 crores of which were in new areas. Programmes of fisheries development have been initiated in most of the important multi-purpose reservoirs in the country. The problems of deep water fishing in such reservoirs were taken up with expert assistance from F.A.O. and improved types of fishing gear have been recommended for adoption. The infestation of aquatic weeds which has been a limiting factor in the production of fish in the inland water areas was studied at the Central Inland Fisheries Research Institute at Barrackpore and methods of eradicating different types of weeds have been devised. An important result of researches has been the successful breeding of Indian Carps in ponds by the injection of pituitary hormone. This method had been tried on a fairly large scale in some States with encouraging results. With a view to solving the problems of fish seed scarcity, the pond breeding Common Carp has been introduced from South East Asia and its culture is now being popularised in various parts of the country. The ten Fisheries Extension Units set up by the Government of India during the Plan period organised demonstrations and rendered technical assistance for the adoption of the scientific methods of fish culture. These activities resulted in increasing the survival of fry in nursery ponds and greater production of quality fish seed. Considerable improvement has been effected in the transport of fish fry by the adoption of improved method of packing them in polythene bags under oxygen pressure. The rate of survival and production of fish has increased in most areas. Inland fisheries development has assumed considerable importance in the programmes of work in C.D. and N.E.S. Blocks and intensive development of inland fisheries on a pilot project basis has been initiated in selected blocks.

A total of 163 candidates from different States were trained at the Central Inland Fisheries Research Institute for inland fishery development work. The Central Fisheries Extension Units and the State Departments of Fisheries organised short-term training courses in inland fisheries work in various parts of the country for giving training to C.D. and N.E.S. Block personnel and non-officials. The Fisheries Extension Units trained a total of 5,091 Gram-sevaks, 177 Block Development Officers, 1317 Gram Sahayaks and 2,011 Block Extension Officers, besides 271 States fisheries personnel, 1417 fishermen and fish farmers.

Marine Fisheries

In the programme of marine fisheries development, emphasis was laid on the mechanisation of fishing boats, to increase the catches and earnings of fishermen. Nearly 1200 new boats were mechanised during the period and the total number of mechanised boats operating in the country by the end of the Second Plan period was 1800. This along with the increased use of synthetic fibre (nylon) nets has largely contributed to increased sea fish production.

For the training of fishermen in the use of mechanised boats and modern fishing gear, 8 more Training Centres were established and 1200 fishermen underwent training during the period. A special course was organised in shrimp trawling and 9 candidates were trained in the field. A total of 22 candidates underwent the four years' training course for skippers. About 20 large vessels undertaking exploratory and experimental fishing and 4 vessels doing commercial fishing are now operating in Indian waters. Three offshore fishing stations for exploratory fishing surveys were established at Cochin, Tuticorin and Visakhapatnam. New fishing grounds were located off Mangalore, Malabar, Cochin, Tuticorin, Visakhapatnam, Calingapatam and off Mahanadi. Fishing Boat Building Yards have been established in Gujarat, Maharashtra, Mysore, Kerala, Madras and Andhra Pradesh. Twenty three fishing boat designers were trained to staff these yards. Twelve additional fishing harbours were surveyed and lay-out sketches were prepared for 9 harbours by an F.A.O. Fishing Harbour Expert. Designs for larger trawlers have likewise been developed. Inadequacy of foreign exchange and shortage of technical personnel were the main bottlenecks in the implementation of marine fisheries development schemes during the Plan period. Considerable difficulties were experienced in the procurement of the required types of diesel engines, synthetic twines and ice and cold storage plants.

Marketing and Distribution

For the production of ice in sufficient quantities for the preservation of fresh fish, 21 ice plants of a total capacity of 168 tons per day were established, besides one mobile ice plant of 3 tons capacity. Twenty two cold storages of a total capacity of 585 tons and 6 freezing plants of 23 tons per day capacity were installed during the period. Six refrigerated railway wagons were introduced on a trial basis on Calicut-Madras, Palasa-Howrah, Ahmedabad-Delhi and Agra-Howrah routes for transportation of fish from the coastal producing areas to the consuming centres. The scheme was sponsored through T.C.M. assistance for refrigeration equipment. With the help of the refrigerated rail wagons introduced between Ahmedabad and Delhi, a beginning has been made in marketing of marine fish in good condition on an organised scale in Delhi. The export of fish and fishery products registered a steady increase, reaching a peak in the year 1959, when products worth Rs. 6.3 crores were exported to foreign countries. Phenomenal strides were made in the export of frozen prawns from India, the Indian product, having entered the world market for the first time.

Research

Marine fisheries research has been substantially strengthened and a new sub-station building at Calicut was opened during the period. The permanent buildings of the Central Inland Fisheries Research Institute was completed at Barrackopre to which the Institute shifted from Calcutta. Both Marine and Inland Institutes have opened many new centres of survey and research.

The Central Fisheries Technological Research Station with different wings for craft and gear and fish processing was established at Cochin making a beginning in systematic researches on technological problems in fishing and fish processing. Quality standards for fish products are being developed.

Efforts have been made through expert assistance to modernise the pearl fishing operations in the Madras State and to rationalise pearl fishing.

Indo-Norwegian Project

The Indo-Norwegian Project now operating in Kerala made further progress during the period. New boats have been designed, mechanisation of boats undertaken and better gear introduced in the areas covered by the Project. An ice and cold storage plant has been established as the base of operations for a co-operative sales organisation to market fish in the Project area. Insulated transport and equipment for preserving fish at the consumption centres have also been introduced.

Co-operation and Private Sector

Co-operative movement in Fisheries has made much progress in Gujarat and to some extent in other maritime States of Kerala, Mysore and Maharashtra.

More developments have, however, taken place in the private sector. Following the initiative taken by the Central and State Governments in the establishment of freezing plants, a number of private individuals and firms took up prawn freezing. 5 Freezing plants and 2 Canning plants in Cochin, I canning plant in Malpe and one freezing plant in Bombay were started during the Second Plan. These firms started freezing and canning of shrimps for export to foreign markets like U.S.A., Sweden, Germany, Canada etc. In addition, about 6 firms also started the shrimp freezing business utilising the facilities available in some of the State Government plants. Central Government took steps to give a greater incentive to the export industry by formulating some special export promotion schemes whereby import of some essential equipment was permitted against the export by the various firms and also a tin plate subsidy scheme to assist the shrimp canners. A policy for foreign collaboration in the fisheries industries was formulated and preparatory work done for establishing a few such concerns.

A critical assessment of the personnel requirements for the development of fisheries was made and steps were taken for the establishment of a Central Institute of Fisheries Education at Bombay with the assistance of U.N. Special Fund. For the coordination of Central and State Fisheries programmes, a Central Board of Fisheries was established in 1959.

EXPLORATORY AND EXPERIMENTAL FISHING IN INDIAN SEAS

Since 1902, occasional attempts have been made at exploratory fishing surveys, commercial fishing and experimental trawling with large sized trawlers. The fishing surveys conducted by Bombay, Bengal and Madras Governments early, on board S.T. William Garrick, and S.T. Madras, S. T. Golden Crown and S. T. Margarita Sutherland, M. V. Turbinella, Sea Scout and S. T. Lady Goschen in the Arabian Sea, Bay of Bengal and Indian Ocean are of particular interest, in view of their exploratory nature under exceptional and unfamiliar conditions with practically no background knowledge and data available on the fishing banks and fishing conditions. These

resulted in the location of some important fishing grounds off the coasts of India and Ceylon, but did not prove commercially successful because of the high cost of maintenance of the vessels, lack of adequate knowledge of the fishing grounds, lack of trained personnel, lack of information on the suitability of different types of vessels for Indian conditions and lack of facilities for berthing, handling and marketing of the catches etc.

Large scale expansion of fishing in India depends on increased offshore fishing activity with relatively large vessels. Since the end of the last war, considerable emphasis has been laid on the development of deep sea fishing to augment the fish supplies of the country. The Central Deep Sea Fishing Station was established at Bombay in 1946 with the object of charting fishing grounds, determining fishing seasons and fishing intensities, assessing the suitability of different kinds of fishing crafts, gear and methods under Indian conditions, training Indian personnel in powered fishing methods and for generally undertaking work that would lead to the development of commercial offshore fishing in India.

S. T. 'Meena', 153′ 5″ in length with a gross tonnage of 426·6, explored and charted an area of 7500 sq. miles of fishing grounds on the north-west coast off Bombay in 18 months. The average catch per day's fishing of 3689 lbs. and the average catch per days absence from port of 1948 lbs. were better than those of the trawlers working in the North Sea, Bay of Biscay and Portugal. She was decommissioned in June, 1949. The results of this experimental fishing indicated that a trawler should be able to operate for at least twenty days in a month for economic operation and this would be possible only if the vessel are ideal for the work, the officers and the crew are fully trained and experienced and the grounds are charted. None of these conditions were full-filled in the case of S. T. 'Meena' but experience had, however, been gained in the organisation of power fishing.

In 1949, two trawlers—M. T. 'Pratap' and M. T. 'Ashok' 83.4 ft. long and gross tonnage of 135 undertook charting and exploratory work in bottom fishing. These vessels continued the exploratory work in the northern region of the West Coast of India and completed charting of 17,000 sq. miles off the coasts of Saurashtra and Bombay within the 40 fathom line. During the four years, 1949 to 1953, the vessels were working on an average for 135 days in a year. Taking into account that no fishing was conducted for more than three months in a year due to the monsoons, each vessel worked for about 15 days on an average in a month and with an average trawling period of about 15 hours per working day. The average catch per day's absence varied from 1412 lbs. to 1903 lbs. and catch per trawling hour from 93.74 lbs. to 178.4 lbs.

In 1953-54, the two trawlers 'Ashok' and 'Pratap' were converted for bull-trawling. Paired trawling from two boats was initiated under the charge of Japanese technicians. The results of fishing operations during the seasons of 1953-54 and 1954-55 showed that bull-trawling yielded better results than other trawling in the same grounds. The catches during 1953-54 and 1954-55 were 361 tons and 209.25 tons respectively. The catches per day's absence and per hour's fishing by bull trawling by the two vessels in 1953-54 are 7776.2 lbs. and 1143.9 lbs. respectively. A comparative study of the two types of operations—other trawling by "Taiyo Maru No. 17" and bull trawling by the two cutters on the basis of the catch per hour of fishing and the quantity and percentage of commercially valuable fish caught, showed that the catch per hour in the case of cutters was nearly 2 to 2½ times that of 'Taiyo Maru' and the percentage of good fish was higher in most of the months. In 1954-55 the average catches by these cutters per day's absence

Trawl net Catch on board 'Baruna', West Bengal Trawler

and per hour's fishing were 5950 and 1291 lbs. respectively. The exploratory trials indicated that the yield of fish from Indian Waters compared very favourably with that of some of the richest fishing grounds in the European Waters and that there are some really rich grounds off the Saurashtra Coast and good potentialities for trawling in these regions.

Under the Second Five Year Plan, the activities of the Deep Sea Fishing Station, Bombay, have been expanded and Offshore Fishing Units have been established at Cochin, Tuticorin, Visakhapatnam and Veraval for undertaking exploratory and experimental fishing on the East and West Coasts. All the power fishing vessels procured under the T.C.M. programme were pooled for operation from these Centres.

Exploratory and experimental fishing operations are being carried out by some of the maritime States. In Gujerat, Kerala and Madras experimental shrimp trawling, purse-seining, mechanised long lining and other methods of fishing have been tried from some of the fishing vessels provided under the Indo-American Aid Programmes. In Madras State an Inshore Fishing Unit is now functioning at Rameswaram from 1959. This Unit is engaged in survey of the fishing grounds around Rameswaram Island and gives information to the fishermen to improve their fishery activities. During the Third Plan period, it is proposed to establish inshore fishing units at other Centres like Tondi, Tuticorin and Colachel and deep sea fishing units at Madras, Nagapattinam, Pambar, Tuticorin and Colachel.

In 1908 a systematic survey of the fishery resources of the Bay of Bengal was made by 'Golden Crown' a steam trawler of the Government of Bengal which indicated the possibilities of trawling in large areas of the Bay from depths of 10-100 fathoms. In 1950, the Government of West Bengal undertook experimental fishing for exploring the so far untapped rich resources of the Bay. A Deep Sea Fishing Station has been established at Calcutta by the Government of West Bengal in collaboration with the Union Government for exploratory fishing in the Bay of Bengal and two Danish trawlers were put into operation with different types of gear. Some rich grounds have been located at the head of the Bay and also at the mouths of the river Mahanadi. A team of three bull trawlers procured under the TCM programme were put into operation from the middle of 1955 for undertaking paired trawling. As a result of the exploratory fishing of these trawlers from 1950 some important fishing grounds which are highly productive have been located in the Bay of Bengal and the fishing operations is being done in these regions at depths ranging from 10-30 fathoms. Early in 1960, a new highly productive fishing ground 'swatch of no grounds' was explored and fishing operations have been extended to a depth of 20-70 fathoms range.

REPORT OF THE DEEP SEA FISHING ACTIVITIES OF THE WEST BENGAL TRAWLERS FROM 1951-1960.

As early as 1908 a systematic survey of the fishery resources of the Bay of Bengal was made by "Golden Crown", a British Steam Trawler of the Government of Bengal which indicated the possibilities of trawling in large areas of the Bay from depths of 10-100 F. It was only in 1950 that the Government of West Bengal undertook on an experimental basis for exploiting the so far untapped rich resources of the Bay. Two Danish trawlers "Sagrika" and "Baruna" were put into operation towards the end of 1950. These vessels made exploratory fishing voyages visiting various fishing grounds with different types of gear. Since the results were encouraging in order to launch regular fishing with a

larger fleet of trawlers three more Japanese trawlers were procured under the T.C.M. programme and were put into operation from middle of 1955.

To bring in uniformity the names of these fishing vessels were changed to Kalyani I to V. From the middle of 1955 onwards the deep sea fishing activities are being conducted by the West Bengal fisheries trawlers Kalyani I to V. The data gathered at Calcutta by the Central Marine Fisheries Research Unit in collaboration with the deep sea fishing scheme of the Govt. of West Bengal from the very commencement of the exploratory operation were analysed and possible details *viz.* vessel-wise catch of the trawlers, area-wise catch, month-wise catch. catch composition of the different species of fishes, total catch, No. of voyages etc. are presented in this paper.

1951.

A total number of 36 voyages were performed by Kalyani I & II out of which 17 voyages were made by Kalyani I and 19 voyages by Kalyani II. The total catch amounts to 284477·28 Kgms. and 319026·96 Kgms. respectively during the period under report. No. fishing was done by Kalyani I in the month of June, July and November whereas, Kalyani II was non-fishing only in the month of July.

I.—Table represents vessel-wise catch of the trawlers.

Name of vessel.	No. of voyages made	Total No. of days absence	Catch by class in Kgm. A	B	C	Total	Grand Total
Kalyani I	17	115	153689·13	125076·74	5711·41	284477·28	603504·24
Kalyani II	19	131	164472·38	149829·05	4725·53	319026·96	

II.—Area-wise Catch of the trawlers.

Area of fishing	Catch by class in Kgm. A	B	C	Total Catch (in Kgm.)
Ofi Black Pagoda	112304·49	103369·62	3016·62	218690·73
„ Western Channel	75650·37	72517·63	1701·42	149869·42
„ Debi & Prachi	29997·43	26291·57	1641·10	57930·10
„ False Bay	13614·35	13288·90	539·32	27442·57
„ Eastern Channel	12360·85	11575·22	1045·99	24982·06
„ Chilka.	11752·78	10888·71	92·99	22744·48
„ Western Channel	6090·61	5844·08	199·81	12134·50
„ Balasore	5467·61	5281·63	..	10749·24
„ Baitarani River	3142·94	2966·27	176·67	6285·88
„ Black Pagoda & Debi & Prachi	3087·15	2222·37	92·99	5402·51
„ Western Channel	3068·55	2956·97	92·99	6118·51
„ Black Pagoda South	22790·98	..	800·14	23591·12
Chilka & Black Pagoda	3635·76	3189·44	409·14	7234·34
„ S. Black Pagoda	2727·45	2639·00	88·45	5454·90
„ Balassore	2194·48	2157·28	74·39	4426·15
„ Unspecified	4063·51	3998·42	111·58	8173·51
„ East of Black Pagoda	2436·25	2306·06	130·18	4872·49
„ Gopalpur	539·32	530·02	9·30	1078·64
„ South of Matlah	771·79	511·44	120·88	1404·11
„ Matlah Pt.	781·09	743·89	37·19	1562·17
„ Baitarani River & Western Channel	1060·04	1041·45	18·60	2120·09
„ Debi, Prachi & False Bay	334·75	297·56	37·19	669·50
„ Western Channel & Eastern Channel	278·96	288·26	..	567·22

Remarks.—The trawlers visited 23 fishing grounds in their 36 voyages and the catch taken offered sufficient proof of the richness of the resources. The results of the experiments in the first year of the inception of the trawlers were encouraging enough for continuance of it on a commercial scale and the fertile grounds located where quality and commercial types were abundant throughout the year promise greater yield with increased effort.

It is observed from the table No. I, that there was a preponderance of 'A' class and very low yield of 'C' Class fish in the catches of both the trawlers. It is also evident from the table No. II that off *Black Pagoda* region yielded the highest quantity, nearly one-third of the years total. During the months of September fishing was concentrated off *Western Channel* which was found to be another fertile fishing ground. The catches were encouraging at off Debi & Prachi River mouths while off *Chilka* region proved to be a fertile ground for quality fishes and March was the only month when this area was exploited.

1952.

Though Kalyani I made 18 voyages 4 were non-fishing and the total number of days spent in fishing were 107 and a total quantity of 215963·05 Kgm. was taken. There was no fishing during March, June and July. Out of 16 voyages made by Kalyani II, 4 were non-fishing and 95 days' fishing brought a catch of 242861·76 Kgm. There was no fishing during July, August & October. Maximum catch was caught in March by Kalyani II whereas in the case of Kalyani I there was no fishing.

I.—Table represents vessel-wise Catch of the trawlers.

Name of vessel	No. of voyages made	Total No. of days absence	Catch by class in Kgm. A	B	C	Total catch (Kgm.)	Grand Total (Kgm.)
Kalyani-I	18	107	81400·33	128574·39	5988·33	215963·05	458824·81
Kalyani-II	16	95	92837·44	145626·06	4398·26	242861·76	

II.—Area-wise Catch of the Trawlers.

Area of fishing	Catch by class in Kgm. A	B	C	Total catch in Kgm.
Off Black Pagoda	73542·98	112625·18	4435·45	190603·61
,, South of Western Channel	29439·51	49598·97	2175·88	81214·36
,, South of Black Pagoda	27998·22	24576·31	1524·98	54099·51
,, Debi & Prachi Rivers	22019·19	18662·3	836·88	41518·45
,, Chilka	7848·05	30456·01	260·37	38564·43
,, Chilka & Black Pagoda	5207·24	11493·12	297·56	16997·92
Unknown	446·34	12878·40	185·98	13510·70
Off Western Channel	3087·15	3254·52	185·97	6527·64
,, False Point	2771·00	3124·34	316·15	6211·49
,, East of Black Pagoda	18·60	3291·72	37·19	3347·51
,, South of Eastern Channel	1617·74	1505·70	111·58	3235·02
,, Gopalpur	148·78	1320·41	..	1469·19
,, Baitarani River	92·99	1078·64	18·60	1190·23
,, Debi & Prachi	..	185·97	..	185·97
,, Debi, Prachi & False Point	..	92·99	..	92·99
,, Balassore & Western Channel	..	55·79	..	55·79

Remarks.—The date of fishing etc. for the year were gathered from the log sheet submitted by the masters. From the table it is observed that *Black Pagoda* continued to yield the largest quantities. There was a fall in the catch from *Western Channel.* A region which was well exploited this year was South of Black Pagoda and it showed an increase in catch of nearly ten times. *Chilka, Off False Point* South of Eastern Channel and Off Baitrani River were fairly unsuccessful and fishing grounds off *Balassore,* and *Western Channel* were least productive. Kalyani I and II fished more in *Black Pagoda.* Fishing in *Debi* and *Prachi* river mouths was successful in February. The nearer fishing grounds off *Eastern Channel* and *Western Channel* were visited in the months of May and September.

1953.

Kalyani I and II made 15 voyages each and both had two non-fishing trips, during the period under report. 101 days' fishing by Kalyani I brought a total catch of 190316·49 kgm. whereas Kalyani II brought 169068·40 kgm. during 97 days of fishing.

I.—Table represents vessel-wise catch.

Name of Vessel	No. of voyages	Total No. of days absence	Catch by Class in Kgm. A	B	C	Total catch	Grand Total
Kalyani I	15	101	12492·39	162066·75	15757·35	190316·49	359384·89
Kalyani. II	15	97	3727·62	159953·46	5387·32	169068·40	

II.—Area-wise Catch of the trawler.

Area of fishing	Catch by class in Kgm. A	B	C	Total catch (Kgm.)
Off Black Pagoda	8159·22	226016·02	4976·36	239151·60
,, Debi & Prachi Rivers	1301·81	14859·23	1450·59	17611·63
,, South Black Pagoda & Debi & Prachi	706·70	4537·74	..	5244·44
,, Baitarani River	37·19	1566·71	73·48	677·38
,, Baitarani River (South)	37·20	111·58	..	148·78
,, Western Channel	..	557·92	37·19	595·11
,, Eastern Channel	..	223·17	..	223·11
,, Chilka	185·97	1041·45	37·20	1264·62
,, South Eastern Channel	18·60	111·58	37·20	167·38

*(Area-wise data for all the voyages are not available).

Remarks.—Kalyani I obtained the highest catch in the month of February. Fishing in the later part of the year excepting December was poor. From May to July there was no fishing. August was a failure. In the case of Kalyani II the highest catch was procured in the month of February and there was no fishing in the month of April.

From the above table No. II it may be seen that maximum catch was obtained from *Black Pagoda* region and it continued to be the most productive fishing ground. Of the other regions exploited, Debi and Prachi river mouth was found to be of average productivity.

1954.

Of the 13 voyages made by Kalyani I, four were non-fishing 63 days were spent in fishing and the catch amounted to 147003·85 Kgms. Kalyani II also made 13 voyages and spent 66 days in actual fishing operation and the catch was 176227·91 Kgm. There was no fishing from June to August, October and December only two days' of fishing was possible and in May the catch was lowest for the year.

I.—Table Represents vessel-wise catch of Trawlers

Name of vessel	No. of voyages	Total no. of days absence	Catch by days in Kgms. A	B	C	Total catch	Grand total (Kgms)
Kalyani I	13	63	7159·96	138504·89	1339·00	147003·85	323231·76
Kalyani II	13	66	18597·29	157184·28	446·34	176227·91	

II.—Area-wise catch of Trawlers.

Area of fishing	Catch by class in Kgm. A	B	C	Total catch (Kgm.)
Off Black Pagoda.	9726·38	201456·76	1264·62	212447·71
„ Debi & Prachi River . . .	11790·68	13520·23	111·58	25422·49
„ Chilka	1041·45	26854·48	..	27895·93
„ South of Matla	260·36	20401·23	148·78	20810·37
„ South of Western Channel . .	111·59	17871·99	74·39	18057·97
„ East of Western Channel . .	2529·23	8145·61	74·39	10749·23
„ Tiger point	185·98	6360·27	111·58	6657·83
„ Matlah point	111·58	1078·65	..	1190·23

Remarks.—The average catch per day of Kalyani I worked out to 5144 Kgm. whereas that of Kalyani II worked out to be 5977 which was a better performance than that of Kalyani I. Of the various fishing grounds visited off *Black Pagoda* continued to be the most productive ground. Debi and Prachi river mouth and Chilka region were found to be good fishing grounds though much less quantities were taken there. This year also 65·8% of the total catch was obtained from *Black Pagoda* region alone. In the areas fished, regions nearer to shore were more yielding than those further away. It is also noted that from September to November Western Channel yielded good quantity of quality fishes. Fishing is possible in this area only during certain seasons.

1955.

During this year three more trawlers were acquired through the T.C.M. Scheme and were put into operation from May onwards. Kalyani I made 8 voyages and brought 104,531·73 Kgms., Kalyani II also made 8 voyages and

the catch amounted to 48,357:48 Kgm., and the Kalyani III made 9 trips and landed 74,193·66 Kgms., whereas 10 voyages of Kalyani IV yielded only 46,719·11 Kgm. Total landings of 53,595:12 Kgm. by Kalyani V was obtained in 9 fishing trips. Individual vessel-wise catch of Kalyani III, IV and V were not available hence the total catch is shown.

I.—Vessle-wise catch of the trawlers.

Name of Vessels	No. of voyages	Total No. of days absence	Catch by Class in Kg.			Total catch
			A	B	C	
Kalyani I . .	8	60	4109·09	97,441·63	2981·01	104531·73
Kalyani II . .	8	21	3645·07	44,001·18	711·23	48357·48
Kalyani III, IV & V . .	33	276	8811·48	122,818·76	429223·00	174553·24

II.—Area-wise catch of the trawlers.

Name of fishing area	Catch by Class in Kg.			Total catch (Kgm.)
	A	B	C	
Off Black Pagoda	4510·52	113767·32	148·78	118,426·62
Off Chilka.	..	24562·03	..	24,562·03
Off East Black Pagoda . . .	14·52	3756·65	37·19	3,808·36
Off East Chilka	14·51	420·03	5·44	439·98
Off South of Western Channel . .	95·25	2136·42	..	2,231·68
Unspecified	612·35	4857·97	1483·25	6,953·57
Off Debi & Prachi	929·86	11009·60	..	11,939·46
Off Tiger Point	892·67	1785·34	376·48	3,054·49
Off Mathla River	..	409·14	148·78	557·92
Off Eastern Channel	..	706·70	74·39	781·09

(*Area-wise data for all the voyages are not available).

Remarks:—

Though from May onwards 5 trawlers were operating, there was not any substantial increase in fish production. Total quantity landed was only 4210·70 Kgms. more than previous year when only 26 voyages were made compared to 47 during this year. As there was no reasonable explanation for this decrease in fising performance, it had to be assumed that conditions unsuitable for fishing prevailed during this year. Kalyani I was found to be superior in catch proficiency to Kalyani II as the other three vessels.

The pattern of fishing followed the same trend observed in the previous year. *Black Pagoda* region continued to be the most productive fishing ground. As has been observed in the previous years winter months of November to February being highly favourable, yielded the major quantity. Gradual decrease in quantities till May with complete failure of fishing in June had been observed.

1956

The total fish production for this year of 374,772.56 Kgm. came from 34 voyages of all the five trawlers. Though this marked an increase over previous three years, yet 1951 or 1952 level was not reached considering the increased number of fishing vessels operating, the fishing was comparatively poor.

Table I. Table represents the vessel-wise catch of the trawlers.

Name of vessel	Total No. of voyages	Total No. of days absence	Catch by class In Kgm. A	B	C	Total catch	Grand Total (Kgm.)
Kalyani I .	10	34	1562·17	137,887·80	4173·96	143723·93	374,772·56
Kalyani II .	4	14	967·06	39,240·28	..	40207·34	
Kalyani III, IV & V .	20	119	7,329·14	171,905·17	11606·98	190841·29	

II. Area-wise catch of the trawlers*

Name of the fishing area	Total quantity in Kgm.
Off Western Channel	9721·76
Off Eastern Channel	1897·08
Off Baitarani River	968·99
Off Debi & Prachi Rivers	89,794·66
Off Debi & Prachi/Black Pagoda	35,219·21
Off Chilka	3,968·24
Off Black Pagoda	2,21,056·53
Unspecified	894·46
GRAND TOTAL . . .	3,63,520·92

(*Data presented, represents only part of the year)

Remarks.—During this year the vessel Kalyani I made 10 voyages out of which three were non-fishing. In January though there were three trips, only one was favourable for fishing. The total quantity brought by this trawler was 143,723.93 Kgms. is 37% of the total for the year. It was observed that off Debi and Prachi rivers produced 4723.71 Kgms. and 35615.17 Kgms. respectively.

Kalyani II made four fishing voyages before dry-docked and only three were successful regarding fishing. Total quantity landed was 40207.34 in 14 fishing days. Black Pagoda region was exploited in these trips and it was found productive.

Kalyani III, IV and V made 9, 5 and 6 voyages respectively with a catch of 92,206.26 kgm., 14268.66 kgm. and 83004.69 kgm. respectively. There was no fishing trips in April to August and October and September were very poor months.

1957

The West Bengal Fisheries Trawlers Kalyani I-V performed 22 voyages spending 248 days in the sea for fishing. The total catch amounted to 482361.50 kgms. and the average catch per day was 1945.00 kgms. There was a considerable decrease in the 'A' class catch when compared to 1951. The 'B' class catch showed a marked increase.

I. Table represent vessel-wise catch of the trawlers.

Name of vessel	No. of voyages made	Total No. of days absence	Catch by class in Kgm. A	B	C	Total catch	Grand total Kgm.
Kalyani I	8	80	2224·32	157242·91	9227·71	168694·94	483326·66
Kalyani III	9	90	3568·28	139866·92	8367·35	151802·55	
Kalyani IV	5	50	2097·06	56090·30	4620·90	62808·26	
Kalyani V	4	40	7448·35	83668·91	8903·66	100020·91	

II. Area-wise catch of the trawlers*

Name of fishing area	Total catch in Kgm.
Off Western Channel	2217·05
Off Baitarani River	2674·28
Off Debi & Prachi Rivers	160501·22
Off Chilka	1733·01
Off Black Pagoda	144700·07
Off Debi, Prachi & Black Pagoda	44940·05
Off Tiger point	14497·64

(*Area-wise catch is not available for the whole year)

Total landings for the year of individual types are given below the weights of the types were compiled from the landing place as well as on board.

Prawn	6113·48	'A' class 15338·01 (kgms.)
Pampus argentus	2787·45	
Cybium spp.	74·54	
Pomadasys spp.	6077·12	
Polydactylus indicus	88·63	
Sciaenids (big)	51·80	
Serranus spp.	131·35	
Otolithus spp.	13·64	
Rastrelliger Cangurta (Small)	594·03	
Perches	4065·05	
Caranx spp.	4280·94	
Upeneus spp.	1851·18	
Rock perches	1521·21	
Ephippus orbis	1318·94	
Leiognathus spp.	35408·73	

II. Area-wise catch of the trawlers

Sciaenids	201984·82		
Kurtus indicus	89741·03		
Small prawns	44·54		
Pellona spp.	5965·31		
Recorda russeliana	856·76		
Opisthopterus tardoore	576·76		
Mugil spp.	2297·95		
Engraulis spp.	1816·64	'B' class	
Unspecified	62905·07		
Harpodon nehereus	1072·17		
Polynemus spp.	278·15		
Therapon spp.	104·08		
Chirocentrus dorab	9·09		
Cynoglossus spp.	8·18		
Miscellaneous	20438·41		
			436869·04
Harpodon nehereus (small)	13961·79		
Muranesox talabonoids	1848·90		
Sharks	928·54		
Skates	1274·42	'C' class	
Rays	3380·12		
Sole fish (small)	41·81		
Arius spp.	5322·20		
Miscellaneous	4361·84		
			31119·62
GRAND TOTAL	483326·66 Kgms.		

Remarks:

There was no fishing during the months of April, May and July. Very little catch was caught in the month of June. About 35.2% of the total catch was obtained in the month of January. Fishing operations conducted during this year indicate definite fishing trends in the sense that colder months of November-March seem to be the best fishing months and the availability of quality fishes decrease from March and complete failure occurs in April.

1958

Out of the five trawlers Kalyani II was inactive throughout the year. The details of the catch of the West Bengal trawlers for the year 1958 was collected entirely from the landing centre, 'shore base station'. The total catch by these trawlers was 349131.75 Kgms.

I. Vessel wise catch of the trawlers.

Name of vessels	Total No. of voy-ages	Total No. of days absence	Catch by class in Kgm. A	B	C	Total catch (kgm.)	Grand total (Kgm.)
Kalyani I	5	52	713·96	62665·73	334·75	63714·44	
Kalyani III	8	78	3678·22	106465·78	2067·49	112211·49	
Kalyani IV	7	70	3093·99	65687·16	3971·70	72752·85	349131·79
Kalyani V	11	110	3188·42	92493·66	4770·93	100453·01	

II. Month-wise catch of the trawlers.

Month	No. of voyages	Catch by class in Kgm. A	B	C	Total catch (Kgm.)
January	5	3079·50	100002·92	532·08	103614·50
February	2	1051·89	42945·48	175·53	44172·90
March	5	2614·07	43062·62	4457·96	50134·65
April	2	540·69	6803·54	2817·76	10161·99
August	1	96·26	3239·61	638·66	3974·53
September	1	156·03	1092·26	245·39	1493·68
October	3	226·78	21811·80	1573·98	23612·56
November	5	975·23	45991·39	629·13	47595·75
December	7	1934·14	62362·71	74·38	64371·23

III. Area-wise catch of the vessels.

Area of fishing	Catch by class in Kgm. A	B	C	Total catch (Kgm.)	Grand total (Kgm.)
Off Western channel	640·48	19638·74	668·69	20947·91	349131·79
,, Balassore	53·37	1636·56	55·72	1745·65	
,, Debi & Prachi Rivers	6404·75	196387·40	6686·92	209479·00	
,, Mahanadi river	1067·46	32731·23	1114·49	34913·18	
,, Chilka	213·49	6546·25	222·90	6982·64	
,, Black Pagoda	1601·19	49096·85	1671·73	52369·77	
,, Tiger point	160·12	4909·68	167·17	5236·97	
,, Mathla Estuary	533·73	16365·62	557·24	17456·59	

Total landings for the year of individul types are given below. The weights of the types were compiled from the landing place.

	Kgms.	
Pomadasys spp.	1893·67	
Prawns	6334·30	
Pampus argentus	1753·84	'A' class
Polydactylus indicus	692·78	10674·59 Kgm.

Sciaenids	169875·10	
Kurtus indicus	94527·80	
Pellona spp.	22060·85	'B' class
Leiognathus spp.	12176·02	
Small perches	4582·37	
Engraulis spp.	2553·04	
Upeneus spp.	2384·38	
Mugil spp.	1440·17	
Miscellaneous	17707·60	327312·33 Kgm.

	Kgms.	
Rays	3243·16	
Skates	713·27	
Sharks	656·43	
Harpodon nehereus	826·95	
Muranesox. talabonoids	3758·06	
Flat fish	132·62	
Trichurus spp.	125·94	
Aruis spp.	670·92	
Leiognathus (small) spp.	557·24	11144·87 Kgm.
GRAND TOTAL	349131·79	

Remarks:—

It is obvious from the table I that Kalyani III had a better fishing year and brought a total of 112211.49 kgm. in her 8 voyages. It is also observed that the lowest total catch of 63714.44 Kgm. was obtained from Kalyani I. Though the number of voyages made by Kalyani III was more and brought a total catch of 112211.49 Kgm. worked out a comparatively low average catch per voyage. It is revealed from table II that there was no fishing during the months of May to July and only one voyage each was possible in August and September. There was a general improvement in the catch from October onwards. The maximum catch was obtained in the month of January.

The increased types in various class of fishes listed above indicate a general improvement in the catch though the total for the year showed a fall over the previous years. Presence of better class perches and Indian Salmon may be taken as encouraging sign for further activities. Smaller quantity of better class and 'B' class perches and increase in clupids and in the eel catches are special features of the catch composition of the year. The last two voyages in March where fishing was confined to nearer fishing grounds in Western and Eastern channels produced greater number of eels. A decrease in the landing of sciaenids and glass fish (*Kurtus indicus*) was noticed though they continued to be the major fishery.

From the available information it was gathered that fishing was concentrated near Black Pagoda and Puri coast upto False point and during rough weather limited operations were conducted near Western Channel and Sand Heads.

1959

A total number of 28 voyages were performed by the West Bengal Fisheries Trawlers' Kalyani I to V during the year 1959. Out of the three voyages of Kalyani I one was a complete failure and unproductive as the vessel met with rough weather and heavy damage. Information *viz.* general catch, area of operation, depth-range, etc., were gathered from the masters after the vessels' arrival at the landing centre 'Shore Base Station' for most of the voyages. Periodical voyages were made in Kalyani III and V.

I. Vessel-wise catch of the trawlers.

Name of vessel	No. of voyages	Catch by class in Kgm.			Total catch (kgm).	Grand total
		A	B	C		
Kalyani I	3	55·40	49804·88	4·54	49864·82	258616·59
Kalyani II	2	..	21259·77	254·46	21514·23	
Kalyani III	8	3601·95	62629·25	2618·04	68849·24	
Kalyani IV	8	820·18	41900·87	2409·84	45130·87	
Kalyani V	7	1200·12	69301·07	2756·24	73257·43	

II. Details of the catch composition and other relevant fishing details taken on board during the year 1959.

Area of fishing	Western channel	False Bay	Off Mahanadi river	Off Black Pagoda
Species	20° 49′-55′ N 87° 50′-59′ E	20° 45′N 87° 45′ E	20° 15′-30′N 86° 45′-87°50′E	90° 45′-49′N 86° 11′-24′E
1	2	3	4	5
Pampus argentues	..	..	1064·00 Kgm.	597·00 Kgm.
Prawn	..	..	63·00	..
Cybium spp	..	..	39·00	8·00
Pomadasdys spp.	..	..	37·00	22·00
Eleutheronma dactylun	..	..	..	49·00
Drapane punctata	..	..	..	6·00
Sciaenids	223·17	388·58	3921·91	1501·00
Leiognathus spp.	34·60	208·27	279·16	626·00
Lutjanus spp. (small)	..	4·52	..	..
Upeneus spp.	130·18	42·05	249·73	38·00
Engraulis spp.	..	16·42	80·00	..
Pellona spp.	19·72	827·85	1134·46	664·00
Reconda russeliana	..	56·34	1153·00	..
Kurtus indicus	..	26·04	603·05	750·00
Small prawns	..	14·84	..	..
Ephippus Orbis	..	..	37·00	..
Caranx spp.	..	..	22·00	..
Lactarius lactarius	..	..	110·00	253·00
Small perch	..	..	37·15	..
Dussumieria spp.	..	..	7·43	..
Sardinella spp.	..	..	0·91	..
Polynemous spp.	..	..	214·32	..
Coilia spp.	..	..	22·32	..
Nemipterus spp.	..	..	...	90·00
Miscellaneous	40·99	173·60	734·00	161·00
Pristis spp.	..	..	149·00	..
Harpodon neherius	..	..	89·00	..
Muracnesox talabonoids	..	..	...	18·00
TOTAL	448·56	1758·51	10447·44	4783·00
Depth range	24-27 F.	13-30 F.	8-17 F.	8½-17 F.
Catch per haul	224·28 Kgm.	195·39 Kgm.	417·89 Kgm.	299·00 Kgm.
Catch per trawling hour	149·52 ,,	155·62 ,,	316·59 ,,	224·55 ,,

(Area-wise catch was available only for four voyages).

III. Details of catch composition of the different species of Fishes.

	Kgm.	Kgm.
Pomfrets	3389·24	
Prawns	1418·52	
Pomadasys hasta	728·86	'A' Class
Polydactylus indicus	86·20	
Pseudoseiaera diacanthus	1·81	
Cybium spp.	47·00	
Drapane punctata	6·00	5677·63
Sciaenids	121528·52	
Kurtus indicus	68267·73	
Clupeids	21961·00	
Leiognathus spp.	14234·14	
Perches (small)	3654·00	'B' Class
Polynemous spp.	192·00	
Caranx spp.	22·00	
Lactarius lactarius	746·09	
Upeneus spp.	992·39	
Miscellaneous	13297·97	244895·84
Eels (*Muranesox talabonoids*)	2927·10	
Saw fish (Pristis spp.)	595·34	
Sharks & Rays	625·89	'C' Class
Trichiurus	120·80	
Harpodan nehereus	492·20	
Arius spp.	2387·75	
Acetes spp.	889·50	
Miscellaneous	4·54	8043·12
GRAND TOTAL	258616·59	258616·59

IV. Table represents area-wise and month-wise catch of trawlers.

Month	No. of voyage	Area of fishing	Depth range	Total catch in Kgm.
January	5	Off Debi & Prachi River mouths	8—10	69573·65
February	4	Do.	8—12	40747·37
March	4	Off Debi & Prachi & Mahanadi River mouths	5—20	29030·37
April	1	Off Mahanadi River	8—12	1940·56
August	1	Off Western Channel	15—20	1054·16
September	3	Off Western Channel, Off-South West of Puri, Off Debi R & Mahanadi	5—25	9756·62
October	1	Off Western Channel, Off Debi & Parchi, South-West of Puri and South of Chilka	8—25	7522·71
November	4	Off South-West of Puri, mouth of Chilka & Debi & Prachi	8—25	33754·05
December	5	Off Western Channel, Off Mahanadi, Debi & Prachi	5—30	65237·10

V. Table represents length measurements of Eight-species of fishes

Sl. No.	Species	Total No. measured	Length range in cm.
1	*Kurtus indicus*	1,789	4·8—12·6
2	*Sciaena glaucus*	720	4·5—21·0
3	*Sciaena aneus*	389	11·2—15·2
4	Sciaena *carutta*	210	10·2—16·2
5	*Scianoides microdon*	328	9·3—19·5
6	*Pellona indica*	1,484	4·5—21·5
7	*Harpodon nehereus*	224	10·5—28·5
8	*Upeneus indicus*	149	8·5—10·5

Remarks:—

It is evident from Table No. I that the highest Catch of 73257.43 Kgm. was obtained by Kalyani V and the lowest total of 21514.23 Kgm. was caught by Kalyani II. Though Kalyani III and IV had maximum number of voyages for the year (8 voyages each) Kalyani V brought in her 7 voyages the maximum quantity which worked out to be a better average catch per voyage in comparison with any other vessels worked during the year. It is also obvious that Kalyani III has brought the maximum quantity of quality fishes belonging to 'A' class category *viz. Pampus argentus, Parastromateus niger, Pampus chinensis, Drapane punctata, Eleutheronaema tetradactylum, Pomadasys hasta, Pomadasys maculatus, Pseudosciaena diacanthus,* which are of high commercial value.

When we analyse the catch composition in relation to the different fishing regions it is suggested that *sciaena* spp. and *Kurtus indicus* occur in large quantities in, off Debi & Prachi rivers and off Mahanadi river mouth. Fourteen species of sciaendis were so far recorded and the commonest forms are *sciaena glaucus, Sciaena aneus, Sciaena carutta* and *Scianoids microdon.* It is also evident that the production is more during the winter season, December and January were the most productive periods. A peak period in the landings was noted in January. During these two months a total catch of 134810.75 Kgm. were obtained which formed more than half the catch of the total fish landings of the year. A gradual decrease in the production of the catch was observed after January right through April. No fishing activities were undertaken by the West Bengal Fisheries Trawlers during the monsoon period May to July.

Sciaenids formed the most important catch constituting 63% of the total catch. A peak period in the abundance in the catch of sciaenids was noted in the month of January. It is also to be noted that there is a remarkable increase in the Clupeids fishery. Though glass fish (*Kurtus indicus*) occurs in almost all the catch, when compared with total landings in the previous year there is an appreciable quantity of decrease in the catch.

1960

19 voyages were performed by the West Bengal Fishing Trawlers during 1960. Out of the five trawlers, Kalyani I had not undertaken any voyage due to major engine trouble, throughout the year. Kalyani II and III made four voyages each, Kalyani IV three voyages and Kalyani V eight voyages. Table below shows an exact picture of landings by class as well as the number of voyages made by each of fishing vessels. Out of the nineteen voyages only for

five voyages, the log sheets were obtained, from the Administrative Officer of the Deep Sea Fishing Board, Government of West Bengal, and for the four voyages of Kalyani III, a detailed account of the catch-composition and other relevant off-shore biological data were gathered by the staff on board the vessel. Kalyani III is the only vessel where accommodation and other facilities were available during the year. With regard to the remaining voyages, details of the catch composition, area of fishing, etc., were collected during unloading at Shore Base Station.

I. Vessel-wise catch of the trawlers.

Name of Vessel	Total No. of voyages made	Catch by class in Kgm. A	B	C	Total catch Kgm.	Grand total Kgm.
Kalyani II	4	531·00	62256·10	—	62787·10	187825·53
Kalyani III	4	3758·80	42122·40	1195·80	47077·00	
Kalyani IV	3	222·00	4605·20	118·00	4945·20	
Kalyani V	8	2327·00	66710·35	3978·88	73016·23	

Among the total catch of 187825.53 Kgm., 'A' class were represented by 6838.80 Kgm., 'B' class by 175694.05 Kgm. and 'C' class by 5292.68 Kgm. The details of catch composition of the different species of fishes landed during 1960 are given below :—

	Kgm.	Kgm.
Pampus argentus	4829·60	
Parastromateus miger	3·00	
Prawns	1243·20	'A' Class
Pomadasys hasta	663·00	
Lutjanus spp.	24·00	
Otolithus spp.	24·00	
Pseudosciaena diacanthus	36·00	
Scomberomorus spp.	16·00	6838·80
Sciaenids	103951·33	
Leiognathus spp.	24232·61	
Kurtus indicus	9280·79	
Pellona indica	17476·27	
Reconda rosseliana	2699·39	
Opisthopterus tardoore	314·90	
Engraulids	746·27	
Upenius indicus	1807·45	'B' Class
Polynemus sexterius	153·68	
Lactarius lactarius	15·00	
Therapon spp.	40·00	
Caranx spp.	239·68	
Small prawns	406·30	
Acetus spp.	75·00	
Muraenesox talabonodis	1006·00	
Miscellaneous	13249·38	175694·05
Arius spp.	1678·15	
Skates	294·00	
Sawfish (*Pristis* spp.)	118·00	
Sharks & Rays	1108·07	
Trichiurus spp.	714·45	'C' Class
Harpodon nehereus	854·00	
Flat fish	28·01	
Miscellaneous	558·01	5292·68
GRAND TOTAL		187825·53

II.—Month-wise and area-wise catch of the trawlers.

Month	No. & voyages	No. of days absence	Depth range (Fathom)	Area of Operation	Total catch (Kgm.)
January . . .	5	51	7—14	Off Debi & Prachi rivers and off Black Pagoda . .	73882·00
February . .	4	29	7—70	Off Debi & Prachi and Swatch of no grounds . .	44115·10
March . . .	1	8	8—12	Off Black Pagoda & off Prachi river .	457·00
September . . .	1	10	15—20	Western Channel .	299·00
October	3	29	8—16	Off Matlah estuary & off Debi river .	8017·00
November . .	2	22	8—16	Off Puri & Chilka & Off Black Pagoda .	23137·00
December . .	3	39	7—25	Eastern Channel, Western Channel & Off Mahanadi river	37918·43

III.—Length measurements of nine species of fishes taken on board.

Sl. No.	Species	Total yield in Kgm.	Area of abundance	Total No. measured	Length range in cm.
1	*Pampus argenteus* . . .	7611·83	Off Mahanadi & off Black Pagoda .	2881	6—23
2	*Sciaena glaucus* . . .	31062·00	Off Debi, Prachi, Mahanadi rivers, sand heads, Off Matlah and Black Pagoda . . .	2487	5·6—23·8
3	*Sciaena aneus* . . .	8960·00	Do.	720	12—15·2
4	*Sciaena curutta* . . .	11947·00	Do.	600	12·5—18·0
5	*Sciaenoids nicrodon* . .	597·00	Do.	224	10—21
6	*Kurtus indicus*	11637·16	Off Debi & Prachi rivers Sand heads & Off Mahanadi·	2928	5—13·8
7	*Pellona indica* . . .	14041·73	False Bay . .	550	6—18
8	*Harpodon nehereus* . .	2406·22	Off Debi & Prachi rivers . . .	380	12—30
9	*Upeneus indicus* . . .	3010·46	Do.	179	8—10

IV.—**Details of Catch composition and other relevant fishing details taken on board during the year 1960.**

Area of fishing	Off Mahanadi river	Off Black Pagoda	Off Debi & Prachi rivers	Eastern Channel	Western Channel	Swatch of no grounds
Species	20°05′—11′N 86°35′—47′E	19°45′—49′N 86°11′—24′E	19°54′—20°N 86°27′—30′E	88°05′N 88°30′E 20°52′—20°55′	20°50′—59′N 87°50′—52′E	21°13′—14′4′ 89°16′—17′6E
	Kgm.	Kgm.	Kgm.	Kgm.	Kgm.	Kgm.
Pampus argenteus	2252·70	400·00	55·00	18·00	18·00	—
Prawns	113·10	121·00	166·00	19·00	19·00	—
Parastromateus niger	—	—	—	—	—	3·00
Lutjanus spp.	—	—	—	—	—	24·00
Pomadasys spp.	—	—	—	18.00	10.00	18.00
Pseudosciaena diacanthus	—	—	9·00	—	4·00	—
Otolithus spp.	—	—	—	—	4·00	—
Sciaenids	10423·50	9306·00	7319·00	522·00	658·00	—
Leiognathus spp.	344·36	88·00	—	—	506·00	—
Pellona spp.	4358·20	4701·00	123·00	210·00	146·00	—
Cybium spp.	22·00	—	—	—	—	—
Opisthopterus tardoore	314·90	—	—	—	—	—
Engraulis spp.	307·36	—	139·00	—	22·00	—
Kurtus indicus	944·70	212·00	155·00	—	—	—
Caranx spp.	153·68	188·00	—	—	86·00	—
Upeneus spp.	307·36	—	—	—	35·00	—
Polynemous spp.	153·68	—	—	—	—	—
Small Perches	—	65·00	—	—	22·00	18·00
Reconda resseliana	—	—	74·00	—	—	—
Lactarius lactarius	—	—	15·00	—	—	—
Miscellaneous	2330·66	2409·00	435·00	52·00	18·00	9·00
Muraenesox talabonoides	—	37·00	582·00	14·00	—	—
Harpodon nehereus	—	—	547·00	—	—	—
Rays	635·00	—	—	—	—	—
Sharks	—	—	—	—	—	3·00
Total	22662·00	17627·00	9619·00	853·00	1548·00	75·00
Depth range	7—13F	11—14F	10—12F	10—30F	10—25F	20—70F
Catch per haul (Kgm)	419·67	626·00	687·07	170·60	258·00	75·00
Catch per trawling hour	306·24	599·55	552·81	158·00	215·00	Only 20 mts. trawling in one haul.

Remarks :—

The highest catch of 73016.28 Kgm. was brought by Kalyani V and the lowest total of 4945.20 Kgm. was caught by Kalyani IV. Though the number of voyages made by Kalyani V was more, Kalyani II worked out a comparatively high average catch per voyage with other vessels. It is also remarkable to note that Kalyani III has brought the maximum quantity of the quality fishes belonging to 'A' Class category. They are mainly represented by *Pampus argenteus, Parastromateus niger, Eleutheronema tetradactylum, Pomadasys hasta, Pomadasys maculatum* and *Psedosciaena diacanthus.*

The deep sea fishing activities of the West Bengal fisheries trawlers Kalyani II–V were suspended from April to August. The fishing operations were confined to off Matlah estuary, Western Channel, Eastern Channel, Off Mahanadi River, Off Debi and Prachi rivers, Off Black Pagoda, Off Puri and Off Chilka at a depth ranging from 7 to 25 fathoms. The fishing was concentrated more towards off Mahanadi river during this year.

It is of interest to note that Kalyani V has explored a new off shore fishing ground "swatch of no grounds" of the Bay of Bengal where the fishing was operated at a depth of 20—70 fathoms on 14th February. The latitude and longitude during shooting and hauling are given below :—

Lat: 20° 13′N Long : 89° 164′E
Lat: 21° 14·4′N Long : 89° 176′E

Fishes such as *Lutjanus diacanthus, Lutjanus malabaricus, Lutjanus johni, Parastromateus niger, Pomadasys hasta, Pomadasys maculatus, Therapon theraps, Umbrina dussumeiri, Lactarius lactarius,* which are of high commercial value formed the major portion of the catch. It is also remarkable to note that most of these fishes were larger in size.

Though there is a sudden decrease in the landings from 63% to 37.18% of Bhola fishery when compared to the previous year, the sciaenids continued to be the major fishery of this Coast.

A peak period in the abundance of sciaenids fishery is noted in the month of February. The dominant species in the catch were *Sciaena glaucus* and *S. aneus* constituting 48.41% and 22.8% respectively. A significant increase in the landings of silver bellies was observed and formed 21.68% of the total catch. A failure in glass fish (*Kurtus indicus*) was noted and were represented by 7.25% as against 21.8% of the previous year. Clupeid constituted 8.74% and were dominated by *Pellona indica, Recorda russeliana* and *Opisthopterus tardoore*. Pomfrets and prawns formed negligible quantity of the catch constituting 4.74% and 0.75% respectively.

There was a progressive increase in the production of marine catch with the approach of winter season, January and February were the most productive periods—a peak period in the landings was noted in January. It is remarkable to note that during these two months a total catch of 117997.10 Kgm. were obtained which formed 66.8% of the total fish landings of the year. It is also to be noted that a total catch of 30094.06 Kgm. were caught from Off Mahanadi river as against the total catch of 187825.53 Kgm. for the year. Out of 30094.06 Kgm., 1251.22 Kgm. were represented by quality fishes belonging to 'A' class category which indicate the quality fishery ground. It is also remarkable to note that between 8—20 F the catch was more abundant.

RESULTS OF OBSERVATIONS

TABLE I.—**Total catch, no. of voyages, catch per class, average catch per voyage for the years 1951—60**

Years	No. of voyages	Catch per class in Kgm.			Total catch in m. tons.	Average catch per voyage (in tons)
		'A'	'B'	'C'		
1951 . .	36	318161·51	274905·79	10436·94	603·50	16·76
1952 . .	34	174237·77	274200·45	10386·59	458·82	13·49
1953 . .	30	16220·01	322020·21	21144·47	359·38	11·98
1954 . .	26	25757·25	295689·17	1785·34	323·23	12·43
1955 . .	47	16565·64	264261·57	46615·24	327·44	6·97
1956 . .	34	9858·37	349133·25	15780·94	374·77	11·02
1957 . .	26	15338·01	436869·04	31119·62	483·32	18·59
1958 . .	31	10674·59	327312·33	11144·87	349·13	11·26
1959 . .	28	5677·63	244895·84	8043·12	258·62	9·24
1960 . .	19	6838·80	175694·05	5292·68	187·83	9·89

The total quantity of marine fish landed during the years 1951 to 1960 amounted to 3726.06 m. tons. Out of the total catch 'A' Class was represented by 599.33 m. tons, 'B' class by 2964.98 m. tons and 'C' Class 161.75 m. tons. The maximum catch of 603.50 m. tons was recorded in the year 1951 and the minimum of 187.83 m. tons in the year 1960. It is remarkable to note that during the year 1951 more than the half of total catch was represented by quality fishes belonging to 'A' class category. There was a considerable decrease in the catch of the quality fishes belonging to 'A' class category from 1952 to 1955, and a sudden decrease in the catch from 1956 onwards was noted. In the year 1960 the total catch of 'A' class fishes was represented by about 3% of the total catch of the quality fishes. The details of fishes landed during the years 1957, 1958, 1959 and 1960 are tabulated and presented below:—

TABLE II.—**Species-wise composition for the years 1957—60**

Sl. No.	Species	Weight in terms of Kgm.			
		1957	1958	1959	1960
1	Prawns	6113·48	6334·30	1418·52	1243·20
2	*Pampus argenteus*	2787·45	1753·84	3389·24	4829·60
3	*Ephinephelus* spp.	131·35	—	—	—
4	*Otolithus spp.*	13·64	—	—	24·00
5	*Parastromateus niger*	—	—	—	3·00
6	*Scomberomorus* spp.	74·54	—	47·00	16·00
7	*Drepane punctata*	—	—	6·00	—
8	*Pomadasys hasta*	6077·12	1893·67	728·86	663·00
9	Sciaenids (big)	51·80	—	—	—
10	*Pseudosciaena diacanthus*	—	—	1·81	36·00
11	*Polydaetylus indicus*	88·63	692·78	86·20	—
12	*Lutjanus* spp.	—	—	—	24·00
13	Sciaenids	201984·82	169875·10	121528·52	103951·33
14	*Kurtus indicus*	89741·03	94527·80	68267·3	9280·79
15	*Rastrelliger canagurta* (small)	594·03	—	—	—
16	*Pellona indica*	5965·31	22060·85	21961·00	17476·27
17	*Engraulis* spp.	1816·64	2553·04	—	74·27
18	*Reconda russliana*	58676	—	—	2699·39
19	*Opisthopterus tardoore*	576·76	—	—	314·90
20	Other clupeids	—	—	—	—
21	Prawns (Small)	44·54	4582·37	—	406·30
22	Perches (small)	4065·05	—	3654·00	—
23	*Caranx* spp.	4280·94	—	22·00	239·68
24	*Acetes* spp.	—	—	—	75·00
25	*Muraenesox talahonoides*	—	—	—	1006·00
26	*Leiognathus* spp.	35408·73	12176·02	14234·14	24232·61
27	*Chirocentrus dorab*	9·09	—	—	—
28	*Cynoglossus* spp.	8·18	—		—
29	*Harpodon nehereus*	1072·17	—	—	—
30	*Mugil* spp.	2297·95	1440·17	—	—
31	*Upeneus* spp.	1851·18	2380·38	992·39	1807·45
32	*Ephippus orbis*	1318·94	—	—	—

Sl. No.	Species	Weight in terms of Kgm.			
		1957	1958	1959	1960
33	*Polynemous* spp.	278·15	—	192·00	153·68
34	*Lactarius lactarius*	—	—	746·09	15·00
35	*Therapon* spp.	104·08	—	—	40·00
36	*Serranus* spp.	1521·21	—	—	—
37	Unspecified	62905·07	—	—	—
38	Miscellaneous	20438·41	17707·60	13297·97	13249·38
39	Sharks	928·54	656·43	325·00	600·07
40	Rays	3380·12	3243·16	300·89	508·00
41	*Pristis* spp.	—	—	595·34	118·00
42	*Trichiurus* spp.	—	125·94	120·80	714·45
43	*Harpodon neherus*	13961·79	826·95	492·20	854·00
44	*Flat fish*	41·81	132·62	—	28·00
45	*Shrinips* & *Acetes* spp.	—	—	889·50	—
46	*Muranesox talabonoids*	1848·90	3758·06	2927·10	—
47	*Leiognathus* spp. (small)	—	557·24	—	—
48	*Arius* spp.	5322·20	670·92	2387·75	1618·15
49	Skates	1274·42	713·27	—	294·00
50	Miscellaneous	4361·84	460·28	4·54	558·01

As a result of continuous fishing by these trawlers from 1950 onwards some important fishing grounds, Western channel, Eastern channel, Sand-heads Off Tiger point, Off Baitarani river mouth, Off Debi & Prachi rivers, Off Black Pagoda, Off Puri Coast, Off Chilka and Off Gopalpur have been located in the Bay of Bengal and the fishing operations being done in these regions at a depth ranging from 10—30 fathoms. On the 14th February, 1960, a new fishing ground "Swatch of no grounds" of the Bay of Bengal was explored and the fishing was conducted at a depth ranging from 20—70 fathoms. It is of interest to note that a large number of species was recorded (*Vide* Table No. IV) and the average consisted of larger specimens. The preponderance of *Pomadasys hasta* is highly remarkable. Another noteworthy feature of this fishing ground is extraordinary large size 'Bhetki' (Lutjnus spp.), 'Baul' (Parastromateus niger), "Rupapatia" (*Trichiurus Savala*) and 'Tangra' (*Tachysurus jella*) which are commercially important.

A detailed scrutiny of the data of the trawlers catches revealed that each of this fishing grounds are dominated by different types of fishes. *Sciaena* spp. and *Kurtus indicus* formed the major catch of Off Debi and Prachi river mouths. Pomfrets and small perches occur in plenty at Off Mahanadi and Off Black Pagoda. The major catches in Western and Eastern Channel were clupedis, leiognathids and silurids. Off Puri and Off Gopalpur perches of medium size were found, while from "Swatch of no grounds" big sized perches and prawns were recorded. A detailed analysis of the trawler catches revealed that :—

(a) Sciaenids formed the major fishery.

(b) Glass fish (*Kurtus indicus*), silver bellies, and clupids formed the next important, fishery.

(c) Off Debi & Prachi river mouths and Off Black Pagoda and Off Mahanadi river regions were found to be the most productive fishing grounds.

(d) Off Black Pagoda, Off Mahanadi river mouth and 'Swatch of no grounds' were noted for quality catches.

(e) The quality and quantity of the catch were more during the winter season and December, January and February were the most productive and favourable months (Table III).

(f) Off Black Pagoda, Off Debi and Prachi rivers, and Western Channel were frequently fished and found to be rich fishing grounds (Table IV).

TABLE III.—*Monthwise catches for Different years (1951—1960) in Kgms.*

Months	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	Total in Kgms.	Total in m. tons.
January . .	80988·00	91405·00	89890·00	119618·00	..	88283·00	138064·00	103614·50	69573·65	73882·00	855212·15	855·21
February . .	57290·00	60153·00	104963·00	67415·00	55311·00	66679·00	68288·00	44172·90	40747·37	44115·10	608757·37	608·76
March . .	109952·00	73478·00	59995·00	56779·00	20230·00	5004·00	63394·00	50134·65	29030·37	457·00	468347·02	468·35
April . .	36915·00	22112·00	8220·00	28045·00	..	..	..	10161·99	1940·56	..	107394·55	107·40
May . .	56802·00	45768·00	2827·00	5542·00	20070·00	..	..	..	..	..	131009·00	131·01
June . .	5560·00	14878·00	..	..	..	4724·00	332·00	..	..	..	25385·00	25·38
July . .	..	..	..	..	22780·00	..	..	..	..	..	22780·00	22·78
August . .	40142·00	4221·00	819·00	..	30094·00	..	775·00	3974·53	1054·16	..	80972·69	80·97
September .	98333·00	39584·00	21659·00	16756·00	23287·00	1147·00	2634·00	1493·68	9756·62	299·00	214842·30	214·84
October . .	36080·00	11307·00	17507·00	..	14281·00	..	9925·00	23612·56	7522·71	8017·00	128145·27	128·15
November .	50422·00	45705·00	3426·00	29347·00	62815·00	74899·00	91164·00	47595·75	33754·05	23137·00	462157·80	462·16
December .	31020·00	50213·00	50079·00	..	78574·00	134037·00	108750·00	64371·23	65237·10	37918·43	620092·76	620·09
TOTAL in metric tons . .	603·50	458·83	359·39	323·23	327·44	474·77	483·22	349·13	258·62	187·83	3725095·91	3725·10

TABLE IV.—*Area-wise catches of different years (1951—1960) in Kgms.*

Area fishing	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	Total in m. tons.
1. Western Channel .	168689·20	87742·01	818·28	18057·97	4252·88	9721·76	2217·05	20947·90	13776·58	4199·00	330·42
2. Eastern Channel .	24982·06	3235·93	167·38	10749·23	781·09	1897·08	..	..	..	3924·37	45·74
3. Off Balasore . .	15175·39	55·79	..	..	..	..	..	1491·64	..	..	16·72
4. Off Baitarani River .	8405·97	1376·20	1677·38	..	..	968·99	2674·28	..	..	..	15·10
5. Off Debi & Prachi Rr..	64002·34	41611·21	22856·07	25422·49	11939·46	107742·86	182771·72	209479·07	207061·08	110196·10	983·08
6. Off Mahanadi Rr. .	27442·79	6211·49	..	..	..	..	..	34913·18	23126·99	30094·06	121·79
7. Off Chilka . .	22744·48	38564·43	1264·62	27895·93	439·98	3968·24	1733·01	9982·64	5550·00	1250·00	113·39
8. Off Black Pagoda .	254388·68	210949·04	239151·60	212447·71	146797·02	238327·53	137369·63	52369·77	..	33337·00	1525·14
9. Off Gopalpur . .	6533·54	55568·70	..	..	..	..	..	..	..	..	62·10
10. Off Tiger Point . .	..	..	..	6657·83	3054·49	..	14497·64	2491 ·00	..	75·00	26·78
11. Off Matlah Estuary .	2966·49	..	..	22000·59	557·92	..	..	17456·59	..	3000·00	45·98
12. Off Puri . . .	..	..	..	..	..	..	..	..	9100·00	1750·00	10·85
13. Unspecified . .	8173·28	13510·25	..	..	6953·57	894·46	..	..	..	..	29·53
TOTAL in m. tons .	603·50	458·82	265·94	323·23	174·78	363·52	341·26	349·13	258·62	187·83	3326·62 metric tons

(Central Marine Fisheries Research Institute, Mandapam Camp.)

THE CENTRAL DEEP SEA FISHING STATION, BOMBAY.

The Government of India as a post-war development scheme established in October, 1946, the Central Deep Sea Fishing Station at Bombay to carry on extensive exploratory fishing operations for charting the fishing grounds, assessing the suitability for Indian conditions of different kinds of craft and gear, determining fishing seasons, training of personnel and for similar other work that would lead to large-scale development of off-shore and deep sea fishing especially with relatively large vessels.

Initially, the stations started operations in 1948 with one steam trawler, S. T. 'Meena' suitably converted for trawl fishing. During 18 months of operation it explored and charted an area of 7500 sq. miles of fishing grounds on the north-west coast off Bombay. With the arrival of two Danish Cutters 'Ashok' and 'Pratap' and two Reekie boats in 1949-50, the vessel 'Meena' was decommissioned and the new vessels were put into operation.

"Ashok" & "Pratap"

Length	83′ 4″
Beam	20′ 8″
Draft	8′ 8″
Gross tonnage	135·0 tons
Horse power	240
Trawling speed	2·5—3·0 Knots

The vessels operated from 1949-50 to 1956-57 off the Coast of Bombay and completed charting 17,000 sq. miles off the coast of Saurashtra and Bombay within the 40 fathom line. The gear used by S.T. 'Meena' was a Peter-Carey type of otter trawl. The cutters 'Ashok' and 'Pratap' used midgest-sized otter trawls of the Hoover type till the end of the fishing season of 1952-53.

Hoover Midget Trawl.

Length of Head rope	64′
Length of Foot rope	80′
Length of Hunt rope	Nil (40′ legs on either side of wings)
Size of Code-end mesh	3″

In 1953, the two trawlers were converted for 'bull trawling' operations. The bull trawl is a two boat trawl of Spanish origin largely used at present in Japan and Philippines and is essentially similar to the North Sea Pareja Trawl and the South American Paranzella. The Brazilian two boats trawl and the Danish Floating Trawl are somewhat different, being designed to fish at surface and mid-water. In Bull-trawling, the net is dragged by the two vessels which keep a certain distance apart so as to spread the two wings of the net properly. Shooting and hauling are done by each of the boats alternately. The essential difference between the bull and otter trawl lies in the absence of the otter boards, in the enormous size of the net itself and to the presence of very long hunt ropes. The net used by the Cutters had the following dimensions:—

Length of Head rope	191·5′
Length of Foot rope	205·0′
Size of Code-end mesh	2·5″

Area of operation.—The whole fishable region in the Arabian Sea has been divided into several rectangular areas of 600 square miles each and numbered, the latitudes and longitudes being used to demarcate these areas. From 1959 onwards area of these squares were reduced to 100 sq. miles. Practically, all the fishing has been done between Bombay and the Gulf of Cutch except for a few hauls in the South of Bombay and North of Cutch. The areas fished by the different vessels fall into the following regions:—

I. Bombay Region: 48, 43, 38, 32, 31, 30.
II. Cambay Region: 26, 25, 24, 20, 19, 18, 17, 11, 10.
III. Veraval Region: 4, 3, 2.
IV. Porbunder Region: A, B, D, E, H, I.
V. Dwarka Region: K, L, M, N.
VI. Cutch Region:

For assessing the fishery productivity of the trawling grounds, these regions are of greater importance than the individual areas which are however, necessary for a complete understanding of the fishery trends. Until the season 1952-53, the Cutters have been concentrating mostly in regions I and II. Subsequently, however, practically all vessels did the major part of their fishing in region V, which has emerged as one of the best fishing ground of the Indian coast. The nature of sea-bottom on all these grounds is muddy.

Fishing Efforts and Total Yields.—The trawler 'Meena' was in commission for a total period of 18 months, from January 1948 and took in all 888 hauls. Out of these only 12 hauls yielded more than 500 lbs. of fish per hour of trawling. Practically, all the hauls were taken in regions I & II. Of the different areas, 11, 18, 19 and 24 yielded more than 200 lbs. of fish per hour. The total quantity caught by 'Meena' for the whole period was 3,57,724 lbs. for a trawling time of 2,143 hours and 199.9 days absence from port. The average catch per hour was 171.5 lbs.

The following table shows the total fishing effort and catches of the Cutters, 'Ashok' and 'Pratap' for the years 1949-50 to 1952-53, 1953-54 and 1954-55. Very encouraging results have been achieved by bull-trawling, as a result of which an Indo-Japanese concern commenced commercial fishing with two pairs of bull trawlers and have proved successful.

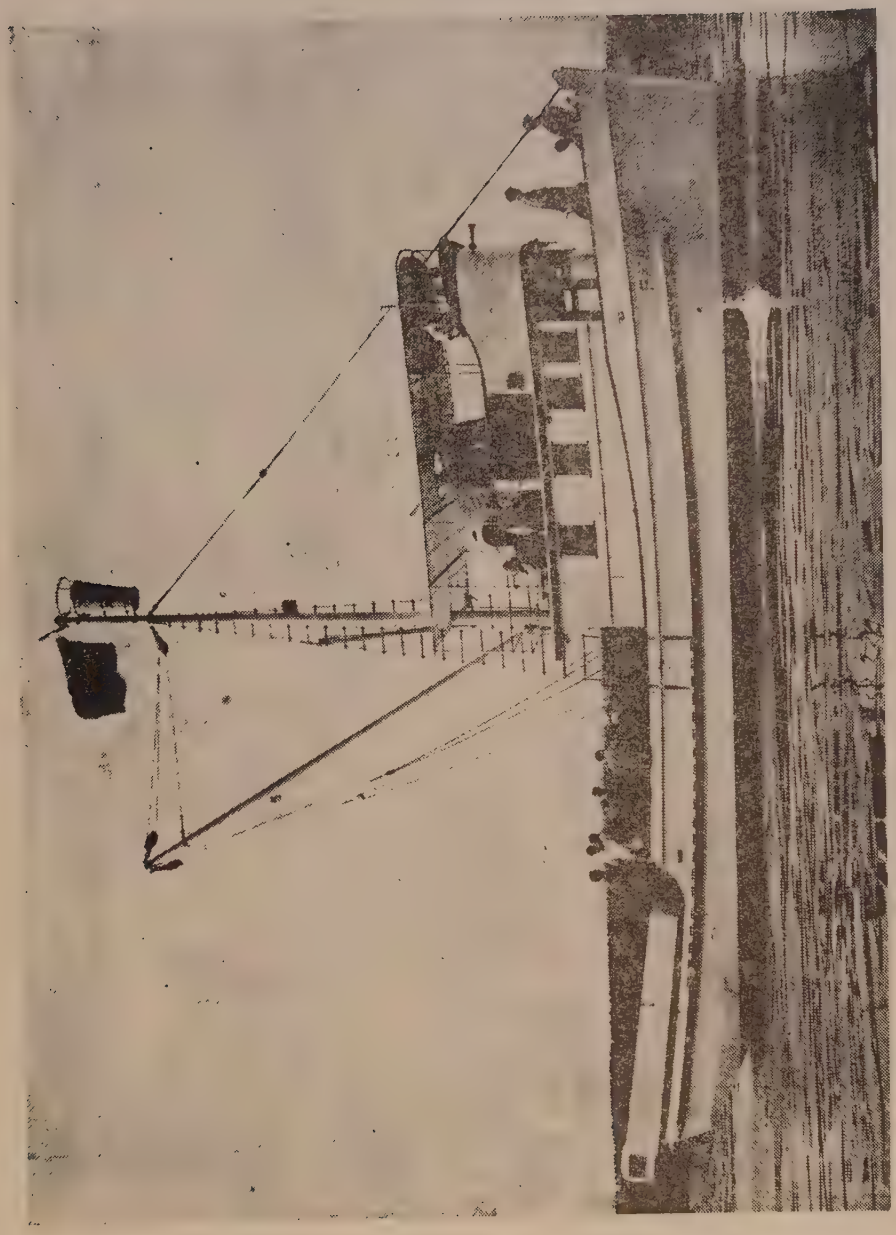
Years	No. of days out of Port	Total fishing effort (Hours)	Total catch in lbs.	Catch per hour (lb.) per boat
I. *Cutters (Ashok and Pratap) Otter trawling.*				
1949-50	242	3,196·3	400,896	125·4
1950-51	279	4,532·3	424,857	94·0
1951-52	249	4,155·7	473,760	114·0
1952-53	309	4,754·5	439,656	92·4
II. *Cutters (Ashok and Pratap) Bull trawling.*				
1953-54	104	704·9	806,400	1143·9
1954-55	77	300·0	468,730	1562·4

The activities of the Deep Sea Fishing Station, Bombay, were expanded during the Second Five Year Plan and Offshore Fishing Stations were established at Cochin, Tuticorin and Visakhapatnam to explore the areas off South West Coast and East Coast of India. By the pooling of the T.C.M. vessels, M.L. Sagar Sundari, M.L. Sagar Vihari, M.L. Sagar Pravasi, M.L. Sagar Kumari, vessels of different sizes were brought under the control of the Deep Sea Fishing Station and were later allotted to various Offshore Fishing Stations. Different kinds of fishing gear such as Otter trawls, gill nets, Tuna long lines etc. were used in exploratory fishing. Two trips were made to Laccadiv Islands in 1959 and 1960 for tuna long lining which proved that tunas are available in our waters and that an effective fisheries for tuna can be established if suitable fishing vessels are available. One of the vessels of the Station 'Jheenga' has been switched on to trial commercial fishing in 1960-61. The following types of Otter trawls were used by the Station:—

(1) Hoover trawl.
(2) Larsen trawl.
(3) Marinovich trawl.
(4) Box net.
(5) Shrimp net.
(6) Russian trawl.

Some of these nets, especially Hoover trawl and Russian trawl, the catches of which averaged nearly 1500 K.gm. per hour, were found to be very effective. These nets either made out of nylon, Kuralon, cotton, hemp or Manila twine were fabricated and rigged by the net mending staff and crew members of the Deep Sea Fishing Station.

In 1957, the Cochin Off Shore Fishing Station was established and in 1958 and 1959 the Offshore Fishing Stations at Tuticorin and Visakhapatnam respectively were also started. The two trawlers 'Ashok' and 'Pratap' were shifted to Cochin in 1957 to explore the areas off Cochin. The programme of exploratory and experimental fishing at Cochin has been closely co-ordinated with the work of the fishing vessels of the Indo-Norwegian Project. The Offshore Fishing Station at Tuticorin has been engaged in experimental fishing off Tuticorin in depths ranging from 2 to 22 fathoms with bottom set gill nets in areas with rocky sea bottom and bottom trawling with nor-overhang otter trawl nets in muddy sea bottom off Punnakkayal. Exploratory and experimental trawling of the coastal waters of the Bay of Bengal from Kakinada to Mahanadi covering an area of approximately 4000 square miles divided into squares of 10 x 10 miles was carried out with four vessels of the Central Offshore Fishing Station in Visakhapatnam by an F.A.O. Fishing Gear Specialist in 1960-61. The main aim of the F.A.O. Project was the study of demersal fishery resources of the Bay of Bengal. Due to various reasons it has not been possible to gather information as to fishing in waters deeper than about 50 fathoms, and only insignificant fishing operations were carried out during the Summer Monsoon period and hardly any fishing could be done at night. Various types of trawl gear were tested and compared as to efficiency and training was given by the expert to the crews and shore personnel in operating and fabricating gear of a more efficient design. The deck arrangement of vessels was also improved significantly. In the grounds covered so far, mainly in the vicinity of Visakhapatnam and Kalingapatnam and near Puri, bottom conditions were generally found to be favourable for trawling. With 'Ashok' the average catch rate was about 100 kg. per hour which indicated that commercial trawling with vessels in this size class might be profitable in the grounds explored.



Purse Seine Fishing Vessel 'BANGADA'

Yearly fish landing from 1947-48 *to* 1959-60 *by the Vessels of the Deep Sea Fishing Station, Bombay.*

Year	Name of Vessel	Quantity landed	Remarks
1947-48	Meena	421·6	January & February
1948-49	Ashok & Pratap	2858·7	
1949-50	Ashok and Pratap	10574·4	
1950-51	Ashok and Pratap	11102·1	
1951-52	Ashok and Pratap	5533·0	
1952-53	Ashok and Pratap	3672·0	
1953-54	Ashok and Pratap	6740·0	
1954-55 1955-56	Bangada, Meera, Durga, Champa, Bumili, Ashok and Pratap.	11581·09	
1956-57		7816·7	Durga upto end of December.
1957-58		6575·8	Ashok and Pratap upto 1957.
1958-59		7119·6	
1959-60		5864·8	

(Deep Sea Fishing Station, Bombay)

Fishing operations report for the half year ending September, 1961 *of the vessels of the Government of India, Deep Sea Fishing Station, Bombay, Veraval and Offshore Fishing Stations, Tuticorin, Cochin and Visakhapatnam.*

Sl. No.	Name of the Vessel	No. of days absent from the port	Quantity of fish caught (kgms.)	Catch per day's absence (kgms.)	Value Realised
					Rs. nP.
	Bombay				
1	M. F. V. Jheenga	69	48,478	703	3,979·62
2	M. L. Sagar Pravasi	10	1,293	129	123·66
3	M. F. V. Bumili	41	15,156	370	1,858·84
4	M.V. Sagar Vihari	5	173	34·5	21·92
5	M.V. Sagar Kanti	7	209	30	41·35
6	M. L. Meera	Under repairs.			
	Cochin				
7	M. T. Partap	55	71,088	1292·5	11,062·51
8	M. L. Durga	60	54,855	914	9,127·36
9	M. V. Tarpon	69	50,520	732	9,590·34
10	M. V. Samundra	49	42,422	866	8,295·12
11	M. F. V. Bangada	8	2,211	276	275·80

Sl. No.	Name of the Vessel	No. of days absent from the port	Quantity of fish caught (kgms.)	Catch per day's absence (kgms.)	Value Realised
	Tuticorin				Rs. nP.
12	M. V. Meenakshi	79	4,790·68	61	1,164·17
13	M. V. Sardinella	99	3,114·17	31·5	903·74
14	M. V. Sagar Sundri	49	14,395·36	294	1,911·23
15	M. V. Meenalochani	96	27,201·88	283	5,297·44
	Visakhapatnam				
16	M. T. Ashok	55	44,889	816	18,078·52
17	M. V. Gudjon	41	18,365·50	448	7,060·70
18	M. V. Champa	94	39,509·00	420	15,146·32
19	M. V. Seahorse	47	9,822	209	3,752·38
20	M. V. Sagar Kumari	51	11,795	231	4,570·38
21	Dan Boat No. 2	148	12,512	84·5	4,042·40
	Veraval				
22	M. V. Sagar Kanti	29	1,138	39·0	978·51
23	M. V. Sagar Pravesi	24	8,643·0	360·0	1,293·30

(Deep sea Fishing Station, Bombay).

THE LANDINGS OF FOUR BULL TRAWLERS OF NEW INDIA FISHERIES LTD., BOMBAY FOR THE YEAR 1961

Name of the Vessel	Period of voyage	No. of days absent from the port	Quantity caught (tons)	Catch per day's absence (tons)	Depth fished (Meters)
Satpati & Pilotan	7-1-61 to 16-1-61	10	70	7	34—41
	17-1-61 to 27-1-61	11	75	6·8	28—40
	28-1-61 to 6-2-61	10	82	8·2	27—41
	7-2-61 to 16-2-61	10	79	7·9	26—38
	17-2-61 to 26-2-61	10	80	8·0	27—38
	27-2-61 to 9-3-61	11	78	7·1	28—40
	10-3-61 to 21-3-61	12	78	6·5	26—44
	22-3-61 to 31-3-61	10	66	6·6	31—44
	1-4-61 to 11-4-61	11	69	6·3	37—44
	13-4-61 to 23-4-61	11	71	6·5	26—45
	25-4-61 to 4-5-61	10	79	7·9	33—47
	6-5-61 to 14-5-61	9	74	8·2	26—46
	27-5-61 to 6-6-61	11	77	7	35—53
	8-6-61 to 18-6-61	11	75	6·8	37—67
	20-6-61 to 1-7-61	12	68	5·7	44—65
	8-7-61 to 18-7-61	11	36	3·3	29—64

Name of the Vessel	Period of voyage	No. of days absent from the port	Quantity caught (tons)	Catch per day's absence (tons)	Depth fished (Meters)
	20-7-61 to 31-7-61	12	61	5·1	35—65
	2-8-61 to 12-8-61	11	70	6·4	32—62
	15-8-61 to 25-8-61	11	70	6·4	42—60
	27-8-61 to 7-9-61	12	67	5·6	27—56
	9-9-61 to 19-9-61	11	67	6·1	37—54
	21-9-61 to 1-10-61	11	67	6·1	28—45
	3-10-61 to 12-10-61	10	83	8·3	29—43
	14-10-61 to 22-10-61	9	66	7·3	28—36
	26-10-61 to 4-11-61	10	80	8	26—32
Arnala & Paj	28-12-60 to 6-1-61	10	61	6·1	27—41
	9-1-61 to 20-1-61	12	74	6·2	22—44
	21-1-61 to 1-2-61	12	75	6·3	24—40
	2-2-61 to 12-2-61	11	73	6·6	27—36
	13-2-61 to 21-2-61	9	77	8·6	26—35
	22-2-61 to 5-3-61	12	73	6·1	22—42
	6-3-61 to 16-3-61	11	81	7·3	31—40
	16-3-61 to 24-3-61	8	38	4·8	34—45
	25-3-61 to 4-4-61	11	70	6·4	24—45
	6-4-61 to 16-4-61	11	78	7·1	25—60
	18-4-61 to 27-4-61	10	67	6·7	28—45
	10-5-61 to 21-5-61	12	80	6·7	28—71
	23-5-61 to 2-6-61	11	58	5·3	35—70
	4-6-61 to 14-6-61	11	44	4	29—70
	16-6-61 to 26-6-61	11	44	4	34—70
	29-6-61 to 10-7-61	12	53	4·4	40—68
	12-7-61 to 24-7-61	13	50	3·8	35—66
	26-7-61 to 6-8-61	12	70	5·8	29—73
	8-8-61 to 19-8-61	12	44	3·7	26—72
	21-8-61 to 1-9-61	12	65	5·4	29—51
	3-9-61 to 11-9-61	9	66	7·3	37—50
	14-9-61 to 25-9-61	12	54	4·5	30—45
	27-9-61 to 7-10-61	11	56	5·1	30—48
	9-10-61 to 17-10-61	9	55	6·1	28—39

EXPLORATORY FISHING BY THE INDO-NORWEGIAN PROJECT IN KERALA

In view of the importance attached to exploratory fishing and seeking out new fishing grounds and training Indian crew to develop the marine fisheries of Kerala, three Norwegian fishing schooners made in Norway were brought to India in 1955. The schooners which ranged from about 50-70 ft. or 34-50 tons gross were fitted with semi-diesel engines and made a speed of 7 to 8 knots. The vessels were equipped with cold storage, automatic pilot, radio telephone, echo-sounder, and fish finder. In the early

stage of the fishing operations from Cochin the activities were hampered by inadequate knowledge on the part of the Norwegian fishermen of fishing grounds, bottom conditions and the behaviour of the fish in those waters, as well as by lack of trained Indian crew. The vessels were also restricted with regard to their area of operation as they were not allowed to operate beyond a distance of 70 miles from Cochin port because of custom formalities and not permitted to fish within a seven mile limit, as this area was reserved for local fishermen with vallams.

The schooners have surveyed the entire coast of Kerala from Cape Comorin to Kozhikode and from the seven mile limit to the edge of the continental shelf, a distance of approximately 240 miles in length and to about 30 miles out to sea. In order to facilitate the analysis of the data and material collected by the vessels, the chart of the Kerala Coastal waters was divided into about 20 numbered zones. It was found that the character of the bottom changes near the 'project area' in Quilon. From Quilon and north to Kozhikode the bottom appears to be covered with sand and mud, extending out to depth of approximately 30 to 40 fathoms, whereas the area from Quilon and south to Cape Comorin was found to consist mainly of sand and shale, the absence of mud being noticeable. In this southern area the presence of coral reefs and rocks in some fishing ground makes trawling operations difficult. Along the edge of the continental shelf, the rocky bottom with high peaks and the coral reefs likewise prevents the use of trawl. Due to strong currents at the edge, fishing with long line has also proved to be rather difficult.

The scattered observations on currents and surface temperatures taken by the schooners during fishing operations are inadequate for statistical purposes, but have proved of value for the skippers in this direction of the operations. The weather conditions are extremely favourable during the larger part of the year. Only the bad weather of the south-west monsoon may give some trouble, as navigation may be hampered due to lack of radio beacons, light-houses, and other sailing marks.

During the survey of the waters of the whole Kerala Coast, all zones have not been surveyed with equal intenstiy. However, those being closest to the base at Cochin naturally have been covered the best while those farthest away so far have only received little attention. It is as yet not possible to present reliable statistics on the availability of fish as to zones and seasons. More time for making surveys and for experimental fishing will be required. The most productive areas seem to be north and south of Cochin, where substantial shrimp bed were located. The waters of the Project Area in Quilon on the other hand do not seem to be rich in fish, and only limited quantities of prawn are caught. The catches of the schooners have been remarkably small during the monsoons, from June to August and from November to December. Strong current may account for this, but there are also indications that the fish disappear from the Off-shore regions during the monsoons. The migration of fish and shrimp is being studied.

There is reason to believe that in the Arabian Sea outside the Malabar Coast are found some of the richest prawn grounds in the world. The prawns caught by the schooners in off-shore waters are of excellent quality, and the average size is about 4-5 inches. Prawns and mixed small fish of inferior quality top the catches of the schooners and are of importance in the total catches during all seasons. Other species caught are, in the order of quantity, Kilimeen, Shark, Skate, Ray, Saw-fish, Pomfret, Sardines, Butter-fish, Killiyarada, Kalava, Cat-fish and Ribbon fish.

The data for the period January 1956 to end of May 1957 show that the schooners caught a total of 117 tons of fish with an average catch of 116 lbs. per fishing hour. The fishing gears used in this experimental fishing were mainly fish trawl, shrimp trawl (otter trawl), hand-line (hook line), long line and purse-seine. In this period 345 trips were made with trawl net with an average catch of 643 lbs. per trip, 27 trips with hand-line and long line with an average catch of 562 lbs. per trip, and 44 trips with purse-seine with an average catch of 14 lbs. per trip. Hook and line fishing at the edge of the continental shelf has proved very encouraging and large catches of Kalava (Rock-Cod) have been taken. There is reason to believe that the Kalava fishery may form the basis of an all year fishery. The purse-seine operations of the schooners in this period were unsuccessful mainly due to unsuitable purse-seines. The purse-seine fishing has later developed very satisfactorily.

In order to examine the economic aspects of fish and prawn trawling operations and for training Indian fisherman four medium sized boats (35 ft.) equipped with 20 HP semi-Diesel engines, echo sounders, and radio-telephones, known as M-boats were brought from Norway to Cochin in late 1956. In contrast to the schooners the M-boats thus were to serve the dual purpose of engaging in experimental fishing and conducting commercial fishing operations. The M-boats were commissioned for fishing operations in February, 1957 and during the whole of 1957 were engaged in fish and shrimp trawling, otter trawling and purse-seining in Cochin area and also took part in a few hook and line fishing experiments at the edge of the continental shelf. Because of the limited operational range and inadequate space for accommodating all the crew members at night, M-boats have mainly been on one-day fishing trips and have generally operated on trawling grounds already located by the schooners. The activities of the M-boats in June, July and August were hampered by monsoon and bad weather. The four boats averaged 123 fishing trips in 1957, the average catch per boat per trip being approximately 1,120 lbs. The gears used were,

Shrimp and fish trawl—376 trips, average catch,			1129 lbs. per trip.
Pair trawl . .	30 ”	”	550 per trip.
Purse-seine . .	44 ”	”	1011 per trip.
Hook and line .	5 ”	”	514 per trip.

The summary of catches and running expenses in 1957 shows a favourable and very satisfactory balance between sales proceeds and running expenses. The result of the first year of trial fishing with medium sized boats from Cochin were very encouraging and promised well for the future.

In 1958 another M-boat 26 ft. fitted with a 10—14 HP semi-diesel engine built at the Projejct's boat yard in Quilon was added to the small fleet of medium sized fishing vessels operating with Cochin harbour as base. Four of the boats were engaged in otter trawling from Cochin and one was mainly detailed for purse-seine experiments employing nets 186 fathoms long and 16.5 fathoms deep and 184 fathoms long and 13 fathoms deep. Fishing was best at between six and twelve fathoms depth. Experience so far indicates that the best period for purse-seine fishing is from the end of the monsoon season in August until December. The training of the Indian crew appears to have been very successful. The results of the technical operation of the purse seining experiments are encouraging and have attracted considerable attention. The operational aspects of the purse-seine fishing trials have been very satisfactory. The five M-boats averaged 133 fishing trips in 1958 with an average catch of 962 lbs. per boat per trip. Thirty-seven per cent of the catch was prawn and 63 per cent fish as against 48 per cent and 52 per cent respepctively for 1957.

(Per Sandven, the Indo-Norwegian Project in Kerala).

[Experimental fishing from the fishing vessels M/V 'Ashtamudi', a 33 ft. decked boat equipped with 36 HP Diesel engine, echo sounder and radio-telephone specially constructed in Norway for operation from Ashtamudi lake, Research vessel 'Kalawa', and INP Medium boats, with purse-seines, otter trawls, shrimp trawls, troll lines and hand lines are being continued by the Indo-Norwegian Project on the Kerala Coast.]

EXPORT AND IMPORT OF FISH AND FISHERY PRODUCTS OF INDIA IN 1960-61

Exports 1960-61

Articles and countries to which exported	*Twelve months ended March, 1961*	
	Quantity (Kgms.)	*Value (Rs.)*
(1)	(2)	(3)
031 Fish Fresh or simply preserved		
031·01 Fish Fresh chilled or frozen		
Hilsa Live or Dead		
U.K.	575	3,818
Nepal	1	8
SM VAL TRNS	122	438
	698	4,264
Fresh Fish Live or Dead others		
U.K.	102	1,244
Germany W	461	2,998
Bahrein IS	788	801
Kuwait	7,155	17,416
Pakistan E	19,438	29,092
Singapore	50,233	79,522
Malaya	461	1,000
Japan	3,000	12,082
Nepal	8	23
Kenya	154	1,598
U.S.A.	6,151	26,749
SM VAL TRNS	12,793	31,574
	1,00,744	2,04,099
Bangdas wet salted		
Kuwait	2,560	2,338
Ceylon	7,35,350	2,65,373
SM VAL TRNS	16,068	15,686
	7,53,978	2,83,397
Soormai wet salted		
Ceylon	1,04,520	1,24,952
SM VAL TRNS	4,064	4,050
	1,08,584	1,29,002

(1)	(2)	(3)
Other Fish wet salted		
Kuwait	1,606	5,870
Ceylon	90,004	61,839
U.S.A.	11,740	49,934
SM VAL TRNS	25,401	22,719
	1,28,751	1,40,362
031·02 Fish Salted Dried or smoked but not further prepared		
Bomlas Dry unsalted		
U.K.	8,827	37,565
Ceylon	9,59,668	21,26,303
Singapore	15,911	34,300
Burma	2,53,948	5,06,583
Rhodesia S	1,020	2,903
Mauritius	2,10,587	3,65,470
U.S.A.	82	1,890
SM VAL TRNS	26,373	51,998
	14,76,416	31,27,012
Fish Dried Unsalted Other sorts		
U.K.	1,112	9,580
Kuwait	[1,270	4,000
Ceylon	2,50,23,88	58,60,224
Singapore	19,296	24,535
Malaya	8,345	42,233
Rhodesia S	508	1,287
SM VAL TRNS	55,386	1,26,634
	25,88,305	60,68,493
Fish Dried Salted		
U.K.	158	1,140
Ceylon	90,33,815	1,67,67,578
Malaya	306	1,805
SM VAL TRNS	76,027	91,864
	91,10,306	1,68,62,387
Shark Fins Fishmaws similar Fish parts		
U.K.	82,103	8,83,167
Ceylon	11	152
Singapore	1,80,342	9,38,656
Malaya	3,093	14,192
Hongkong	31,229	2,92,867
Burma	299	7,500
SM VAL TRNS	7,356	[21,723
	3,04,433	21,58,257

(1)	(2)	(3)
Other sorts		
Ceylon	10,724	15,222
Singapore	5,954	6,603
Nepal	..	22
U.S.A.	516	2,235
SM VAL TRNS	3,233	4,540
	20,427	28,622
031·03 Crustacea and Molluscs Fresh chilled frozen salted dried or simply cooked		
Crustacea Excl. Prawn		
France	3,824	29,433
U.S.A.	10,120	71,772
SM VAL TRNS	1,232	6,326
	15,176	1,07,533
Prawns		
U.K.	14,681	76,355
Germany W	255	2,693
Netherlands	2,241	10,097
France	10,189	50,602
Hungary	3,050	12,050
Kuwait	12,806	33,225
Trcl. Oman	264	1,560
Ceylon	2,58,002	5,79,799
Singapore	1,61,245	5,42,917
Malaya	37,707	40,300
Hongkong	2,42,248	7,82,927
Saudi Arab	1,078	3,633
Burma	24,80,209	66,18,703
Rhodesia S.	508	1,826
Zanzibar	..	16
Mauritius	1,28,135	1,38,741
Canada	5,500	40,186
BR. Guiana	563	2,470
U.S.A.	11,08,006	52,22,822
FR. W. Indies	761	5,680
Australia	58,039	3,45,258
Fiji Is.	205	1,410
SM VAL TRNS	12,344	39,701
	45,38,036	14,55,25,971
TOTAL 031	1,91,45,854	4,36,66,399

(1)	(2)	(3)
032 Fish and Fish preparations canned or not		
032·01 Fish, Fish Products and Fish Preparations in Airtight containers including crustacea and Molluscs		
Crustacea and Molluscs Prepn. canned.		
U.K.	13,722	70,972
Sweden	154	1,175
Denmark	3,034	23,608
Netherlands	256	2,736
Switzerland	120	1,510
Italy	666	7,650
Aden	256	2,393
Kuwait	204	2,330
Trcl. Oman	205	2,881
Kenya	461	4,778
Mozambique	819	10,680
Canada	5,149	37,794
U.S.A.	14,289	1,05,296
SM VAL TRNS	928	8,428
	40,263	2,82,231
Fish canned excl. Sardines Pilchards		
U.K.	20,286	1,89,791
Finland	2,835	29,156
Sweden	13,841	99,770
Denmark	5,366	47,425
Germany W	512	5,997
Netherlands	1,534	14,192
Switzerland	1,382	11,212
Italy	3,457	33,135
Cyprus	256	3,320
Aden	699	7,436
Bahrein Is.	1,135	9,584
Kuwait	112	1,155
Trcl. Oman	283	3,625
Singapore	567	6,000
Rhodesia S	442	4,754
Kenya	710	5,802
Canada	8,754	78,339
U.S.A.	2,76,868	14,07,172
Puerto Rico	461	4,839
Fr. W. Indies	1,417	13,462
SM VAL TRNS	408	3,441
	3,41,325	19,79,607

(1)	(2)	(3)
Sardines and Pilchards canned		
Netherlands	666	5,886
Cyprus	272	3,370
Bahrein Is.	410	3,272
SM VAL TRNS	..	30
	1,348	12,558
Other Sorts		
Sweden	717	6,559
Italy	1,870	21,600
Cyprus	256	3,250
Trcl. Oman	205	2,795
Kenya	307	2,951
Puerto Rico	953	8,620
SM VAL TRNS	456	3,173
	4,764	48,948
032·02 Fish, Fish Products and Fish Preparations not in airtight containers including crustacea and Molluscs		
Fish Prodt. Prepn. Nes not canned		
U.K.	4,531	16,743
Bahrein Is.	736	2,700
Ceylon	30,480	9,120
Singapore	1,14,531	32,430
Malaya	2,19,407	92,876
Saudi Arab	205	1,105
Canada	3,232	30,226
SM VAL TRNS	6,847	11,703
	3,79,969	1,96,903
TOTAL 032	7,67,669	25,20,247
411 Animal Oils and Fats		
411·01 Oils from Fish and Marine Animals		
Others		
Bahrein Is.	15,403	5,753
Kuwait	18,282	8,155
Trcl. Oman	1,29,679	51,252
Maldives	1,800	1,400
Muscat	2,858	1,800
Saudi Arab	45,570	29,983
Iraq	67,499	35,557
Burma	1,075	1,300
SM VAL TRNS	31,671	13,215
	3,13,837	1,48,415

(1)	(2)	(3)
672 Natural and Cultured Pearls unworked		
Pearls cultured		
Germany W	..	2,170
	..	2,170
672·04 Natural and cultured Pearls worked But not set		
Pearls real worked		
Kuwait		1,49,364
Ceylon		4,685
Singapore		9,260
Iraq		6,117
		1,69,426
Pearls cultured worked		
Switzerland		1,586
Singapore		7,076
U.S.A.		46,356
Surinam		2,295
		57,313

NOTE:– "SM VAL TRNS" indicates Small-valued transactions.

Imports 1960-61

(Twelve months ended March,:1961

Articles and countries from which imported	*Quantity (Kgms.)*	*Value in (Rs.)*
(1)	(2)	(3)
031 Fish Fresh or simply preserved		
031·01 Fish Fresh chilled or frozen		
Hilsa Live or dead		
Pakistan E	36,94,867	83,61,980
SM VAL TRNS	11,46,521	26,45,515
	48,41,388	1,10,07,495
Fresh Fish live or dead others		
U. K.	2,048	1,504
Pakistan W	93,184	1,12,038
Pakistan E	95,51,542	1,80,23,437
Ceylon	40	1,404

(1)	(2)	(3)
Malaya	..	188
Hongkong	51	2,014
SM VAL TRNS	17,48,858	27,91,548
	1,13,95,723	2,09,32,133
Bangdas wet salted		
Pakistan E	8,090	23,798
	8,090	23,798
Soormai wet salted		
Pakistan W	1,280	4,251
Saudi Arab	1,39,207	1,62,720
	1,40,487	1,66,971
Other Fish wet salted		
U. K.	25,907	23,093
Pakistan W	16,26,993	13,63,547
Pakistan E	5,66,092	10,23,374
Saudi Arab	31,600	44,240
SM VAL TRNS	18,822	15,144
	22,69,414	24,69,398
031 ·02 Fish Salted Dried or Smoked but not further prepared		
Bomlas dry unsalted		
Pakistan E	1,64,643	1,88,808
SM VAL TRNS	2,463	2,216
	1,67,106	1,91,024
Fish Dried Unsalted others sorts		
Pakistan W	1,04,677	40,715
Pakistan E	1,91,895	2,25,251
Maldives	768	1,726
Muscat	3,22,695	1,26,692
Saudi Arab	168,484	83,020
SM VAL TRNS	16,228	12,727
	8,04,747	4,90,131
Fish cured		
U. K.	512	1,162
	512	1,162
Fish Dried Salted		
Pakistan W	4,454	1,794
Pakistan E	23,868	27,983
SM VAL TRNS	2,575	3,632
	30,897	33,409

(1)	(2)	(3)
Fish Smoked		
U. K.	205	3,422
Denmark	411	3,135
SM VAL TRNS	925	6,300
	1,541	12,857
Shark Fins Fishmaws		
Similar Fish Parts		
SM VAL TRNS	51	572
	51	572
Other Sorts		
Pakistan E	1,587	3,600
SM VAL TRNS	480	3,326
	2,067	6,926
031.03 Crustacea and Molluscs Fresh chilled frozen salted dried or simply cooked		
Prawns		
SM VAL TRNS	152	438
	152	438
TOTAL 031	1,96,62,175	3,53,36,314
032 Fish and Fish Preparations canned or not		
032.01 Fish, Fish Products and Fish Preparations in Airtight containers including crustacea and Molluscs		
Crustacea and Moll		
Ugc Prepn canned		
SM VAL TRNS	102	453
	102	453
Fish Canned Excl,		
Sardines Pilchards		
U. K.	6,551	15,743
SM VAL TRNS	3,146	13,157
	9,697	28,900
Sardines and Pilchards canned		
U. K.	126	1,506
Norway	256	1,856
Portugal	984	2,579
SM VAL TRNS	1,792	5,748
	3,158	11,689

(1)	(2)	(3)
Others sorts		
U. K.	200	1,123
Germany W.	244	1,010
Switzerland	2,102	14,359
SM VAL TRNS	665	4,069
	3,211	20,561
032.02 Fish, Fish Products and Fish Preparations not in airtight containers including crustacea and Molluscs		
Sauces Fish Crustacea and Molluscs		
SM VAL TRNS	172	354
	172	354
Fish Product Preparation Nes not canned		
U. K.	461	1,410
Denmark	210	2,195
SM VAL TRNS	660	1,691
	1,331	5,296
TOTAL 032	17,671	67,253
081 .04 Meat Meal including tankage and fish meal Fish Meal		
Sweden	..	650
	..	650
411 Animal Oils and Fats		
411.01 Oils from Fish and Marine Animals		
Cod Live Oil in other containers :		
U.K.	59,408	78,902
Norway	39,138	53,341
	98,546	1,32,243
Shark Liver Oil Comml Quality		
Japan	5,385	27,099
	5,385	27,099
Sperm Oil		
U. K.	67,767	93,678
Norway	8,527	11,711
Cyprus	4,626	7,050
	80,920	1,12,439

(1)	(2)	(3)
Whale Oil Crude		
U. K.	3,674	5,290
	3,674	5,290
Others		
U. K.	35,000	50,874
Sweden	2,509	3,383
U.S.A.	356	579
SM VAL TRNS	451	576
	38,316	55,412
TOTAL 411.01	2,26,841	3,32,483
672.03 Natural and Cultured Pearls unworked		
Pearls Natural		
Italy	..	19,999
Behrein IS	..	2,33,912
Kuwait	..	41,155
Trcl. Oman	..	1,38,453
Pakistan W.	..	8,200
Hongkong	..	10,350
Iraq	..	11,258
Japan	..	41,53,156
Brazil	..	3,776
		46,20,259
Pearls cultured		
Behrein IS	..	7,166
Hongkong	..	24,283
Japan	..	23,10,457
SM VAL TRNS	..	796
		23,42,702
672.04 Natural and cultured Pearls worked but not set		
Pearls real worked		
Japan	..	12,994
		12,994
Pearls cultured worked		
Japan	..	63,072
		63,072

NOTE :—"SM VAL TRNS" indicates Small-valued transactions.

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